

MOTOR AGE

Vol. XXXI
No. 11

CHICAGO, MARCH 15, 1917

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Three dollars a year

HUDSON REPUTATION

Helps Dealers to Sell More Cars

"Reputation is the best ingredient in merchandise. . . . For when a man or firm undertakes to build a reputation for an article he quite naturally guards it as he would his life."

LOUIS D. BRANDEIS

Justice of the Supreme Court of the U. S.

SINCERITY in all merchandising and manufacturing methods has built an enviable reputation for Hudson. To-day we are the largest makers of fine cars in the world.

Men who sell the Hudson Super-Six profit by this reputation. They share it. They are recognized as the leading automobile merchants of their communities.

Because of this reputation, it is easy to sell the Hudson Super-Six. Last year 28,000 Super-Sixes were built, but the demand exceeded this by many thousands. This year production will be increased, but con-

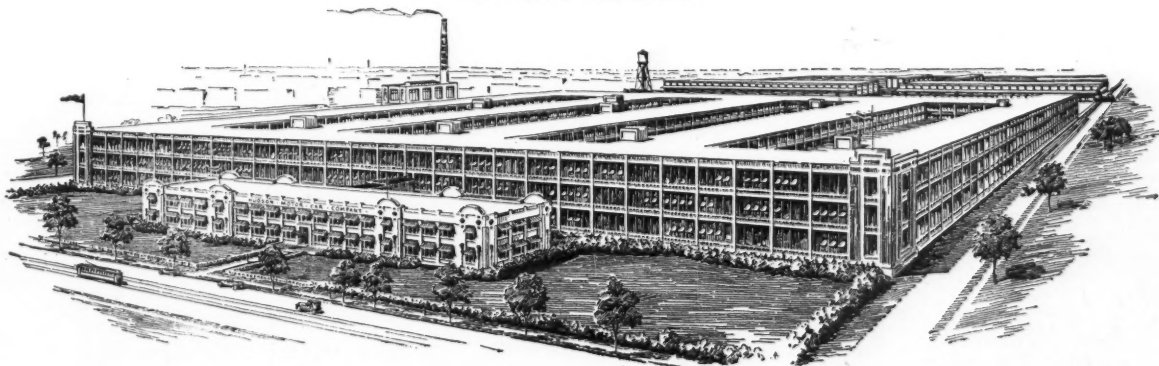
ditions will be much the same, for the Hudson Super-Six is the most wanted car today.

It is easy to understand then why Hudson franchises are in such demand. Rarely is there one available. From time to time new opportunities arise. Sometimes a dealer fails to measure up to the Hudson standard and must be replaced. At such a time we want to know the names of all real automobile merchants.

If you feel that you some day might like to become a Hudson dealer and to share this reputation that other Hudson dealers enjoy, send us your name.

HUDSON MOTOR CAR COMPANY

DETROIT, MICHIGAN



Stewart Products



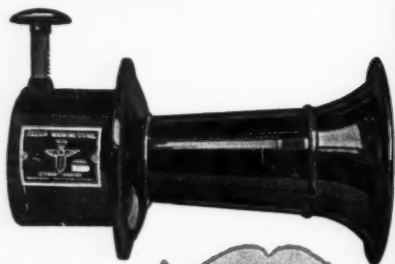
Stewart
Speedometer
for Fords
\$10



Stewart
Motor Driven
Warning Signals
\$6



Stewart
Tire Pump
\$12



Stewart
Hand Operated
Warning Signal
\$3.50

Every Big Success Invites Competition

A remarkable success in any line always attracts scores of imitators.

For instance: there is no other system like the Stewart Vacuum System—and there is no other in sight.

But doubtless because of its astonishing success, a few crude imitations of the Stewart Vacuum System will make a bid for public favor.

But they will always be experiments—nothing more.

The Stewart principle is so exceedingly simple it cannot be imitated without copying the entire system.

The Stewart Vacuum System is now used on over 70% of all American makes of cars—a tribute to its efficiency—an indication of its success.

It will pay dealers to see that every car is equipped throughout with Stewart Products.



Stewart-Warner
Speedometer Corp.
Chicago, U. S. A.



Stewart
Speedometer
\$25



Stewart
Spark Plug
\$1



Warner
Auto-Meter
\$50



Stewart
Vacuum
System
\$10

MOTOR AGE

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March 15, 1917

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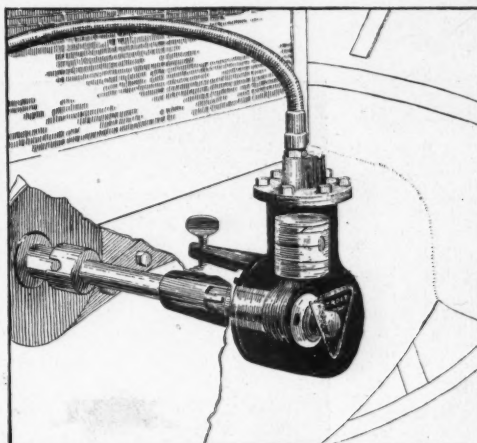
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ANNOUNCEMENT

"Italy's Ambulance Service" will be the feature of
Motor Age next week, and in it you will read of the
ambulance workers who carry the wounded from the
field while battles still are raging. The author, W. F.
Bradley, Motor Age's special war correspondent, writes
from the experience of ambulance service and illus-
trates his article with his own photographs.



You Can Trust the Man Who Picked Your Motor to Pick Your Tire Pump

If the engineer who built your car came
to you personally and said: "I would
advise you to use a DETROIT Gearless
Crank Shaft Tire Pump"—that would be
enough recommendation, wouldn't it?

That is practically what the engineers of
the majority of cars between \$800 and
\$1300 have done, when they designed
their crank shafts specially to use

GEARLESS DETROIT CRANK-SHAFT TIRE PUMP

Pat. Aug. 25, 1915

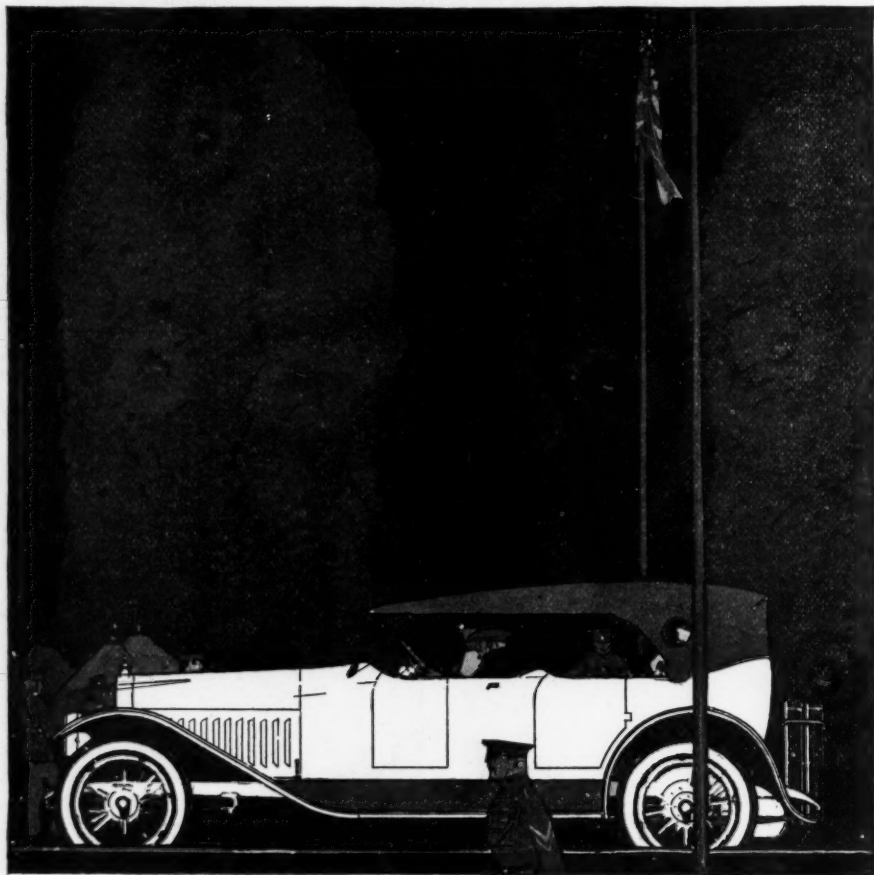
There is no need for owners of cars be-
tween \$800 and \$1300 to pull and push
hand tire pumps, now that the DETROIT
Gearless Crank Shaft Pump is available
for only \$10—recommended beyond the
possibility of a doubt by engineers who
know.

Goes on and off in a jiffy. Attached with-
out tools or adjustments to the end of
the motor crank shaft. Carries in the tool
box when not in use. Not a rubber dia-
phragm device.

NOW READY FOR Briscoe, Dodge,
Chandler, Hudson, Overland, Reo, Stearns,
Saxon 1916, and Studebaker cars. **\$10**
One price

Order from your dealer, or write us direct.
DEALERS—Ask your jobbers. They know.

Detroit Accessories Corp.
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White
Sixteen valve 4

THE SIXTEEN-VALVE FOUR has the unique distinction of being the most far-reaching improvement in engine design in recent years and still the most conservative. There has been no departure from the basic simplicity of the four-cylinder motor.

High power and utmost flexibility have been attained by the most direct means—increasing valve capacity without the roundabout method of multiplying cylinders to secure the same end.

By having two sets of intake and exhaust valves in each of the four cylinders a full flow of explosive gas is secured at any engine speed, thus maintaining full power at high engine speed and a degree of flexibility at low speed unobtainable in any other type of motor.

THE WHITE COMPANY
CLEVELAND



MOTOR AGE

MONTGOMERY—Cradle of the Confederacy

by William
K Gibbs

The White House
of the Confederacy,
used by Jefferson
Davis, C. S. A.
president, in 1861



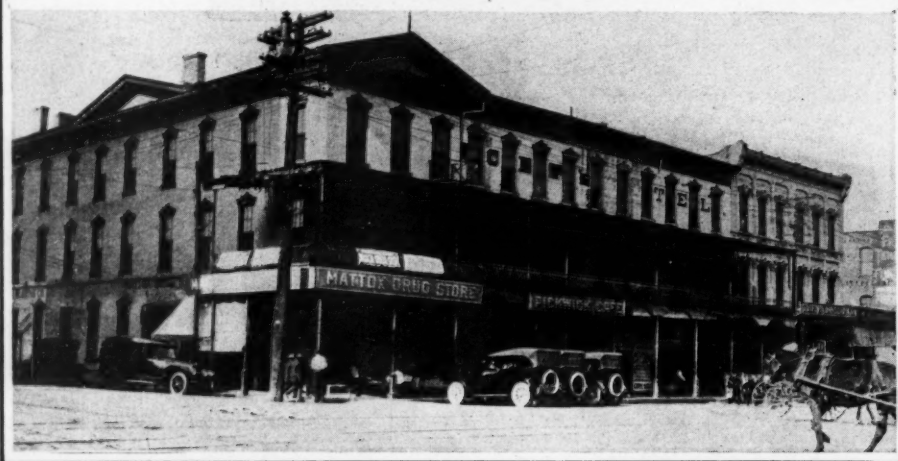
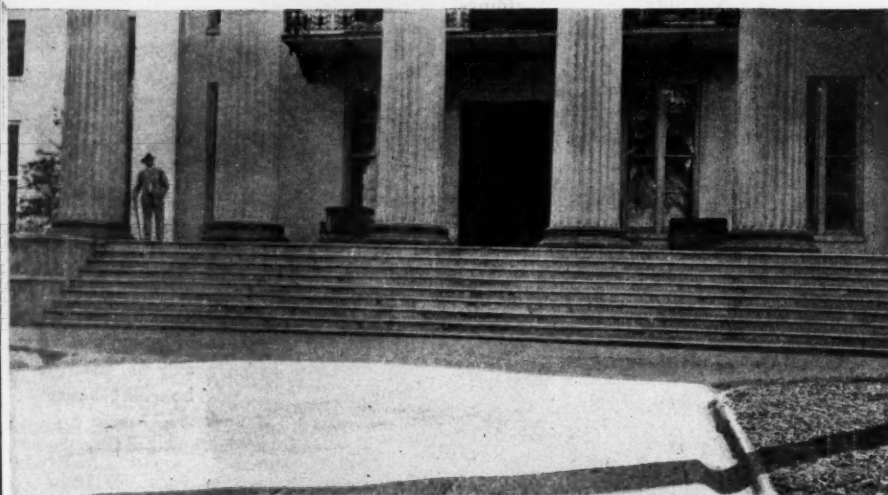
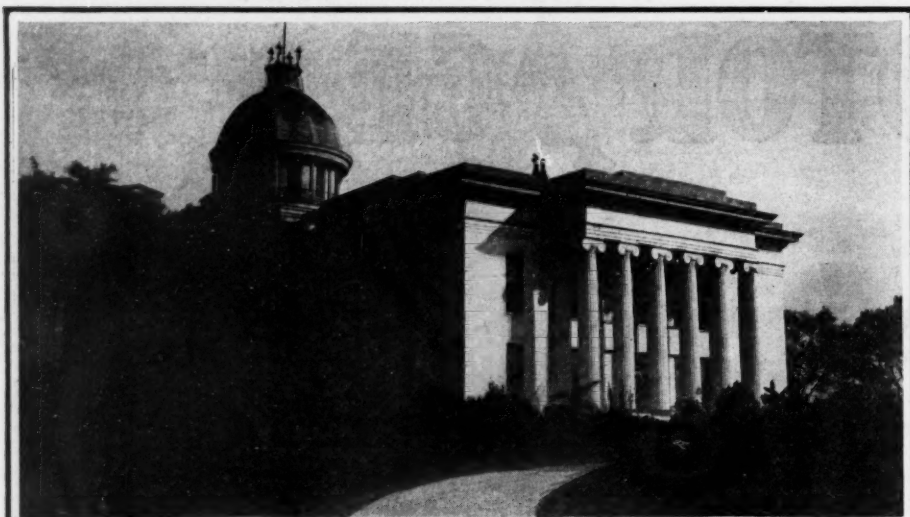
This old building
still stands at
Montgomery, Ala.,
and is used as a
boarding house

A HALF century blots from the minds of men much of early discord, yet down below the Mason and Dixon line there still remain a few who continue fighting the War of the Rebellion and those who have passed on, in many cases, have inculcated in the minds of their descendants the thought that in memory the Civil War is still on. A few think the "rabid Southern Democrat" feels but little different toward the "black Republican" of the North than he did in the days when the blood of the blue and the gray mingled in a common stream from a crimson battlefield. One hears much in the South to-day of the erasure of the imaginary line separating it from the North. Lincoln is said to be revered with almost if not quite the same fidelity as Lee and Davis, but withal, the South takes great pride in telling of its victories, in recounting its part in the struggle and especially in pointing out places where history was written in the early sixties.

If there is one place in Alabama where it may be said that the Southerner is more insistent that the visitor turn back the pages of memory—or direct his mind, if



his years be not so many as to take him back to the days of '61—it is Montgomery. In the two days I had spent driving up from Mobile late last fall I had been associated, because of my membership in the editorial fraternity, with a number of different pilots, each of whom had the historical details of the particular country through which we were passing at his tongue tip and at the end of those two days I had been so surfeited with historical points of interest that it seemed to me the Civil War must have had its focal point in Alabama. As a fitting climax to this second day, and before I had an opportunity to remove the dust of a 125-mile drive from Thomasville that by reason of the dry weather and the red sand-clay roads made me look more like an Indian than a Caucasian, my guide insisted that I see the "Cradle of the Confederacy," in other words the White House of the Confederacy, which appears at the beginning of this story. Incidentally I was taken for a glimpse of the first executive offices of the Confederate States of America and a number of other historic scenes before I was deposited at the hotel.



Top—The Alabama state capitol, in which the Confederate government was organized early in 1861. Many relics of the Civil War are found within. Center—The capitol steps from which Jeff Davis delivered his inaugural address as president of the Confederacy. Below—Structure that housed the first offices of the Confederate States of America. Commercialism has eradicated all historic evidence except a tablet

As I said, for two days I had been coming from Mobile, through towns in many cases that hardly deserved the name, and it seemed good to see a progressive city. During the evening of my arrival in Montgomery I was told a story that so clearly illustrates what some towns in the South—and I may add the whole country—are, especially some of those through which I

had been in the two previous days, that I am going to tell it briefly, even at the risk of arousing some of the sunny southern dispositions. It was told by a Southerner, of a Southern town, and in a Southern city and I am but repeating it. That's my alibi.

In Montgomery, according to the gentleman who told the story, there is a nigger

—preferred Southern classification—whose earning propensities seem most lucrative when repairing stoves, but his ambition is to be a second Lew Dockstader, in other words, to head a minstrel troupe. Whenever he gets enough money corraled from repairing stoves, he gathers a small band of his race together and they begin a circuit of Southern towns in quest of the dollars set aside for thespians. About the time the story was told me this nigger had returned from one of these theatrical trips and it was evident that fate had not been kind to him. The man who told the story questioned the nigger something after this fashion:

"Where you-all been, Sam?"

"Ah's been out on de road agin, suh."

"Make any money?"

"No, suh, Ah didn't make no money, no suh."

"Have a good show?"

"Yas suh, yas suh, we had a good show."

"Then why didn't you-all make money?"

"Ah don' know, suh, people jes didn't come, dat's all."

"Where did you-all break up, Sam?"

"We-all broke up in Dawson, Georgia, suh."

"What's the matter, Sam, isn't Dawson a good town?"

"No, suh. We-all give away eight comps and only six people came. Ah guess other people had bad luck in Dawson too, 'cause in ma dressin' room someone had written on de wall: 'Why did God destroy Galveston and leave a town like this?'"

It must not be inferred that the South has no progressive cities, for it has, many of them, and among them is Montgomery,



Tablet marking the building which was used for the first offices of the C. S. A.



Bird's-eye view of Montgomery as seen from one of the city's highest office buildings. The capitol dome is seen in the distance



Frequently as we passed along the roads out of Montgomery we saw such sights as this. Cotton was bringing a record price last fall.

well up toward the top, too. Montgomery earned its title as "the Cradle of the Confederacy," not because it was first to secede from the U. S. A., but because here was the first seat of government of the Confederate States of America.

To give you a better conception of the city of Montgomery it is necessary to delve further back into the early history than the beginning of the Civil War. Montgomery is as old as the state of Alabama, having been formally founded on the site of an Indian village called Ecunchatty, and first named New Philadelphia, December 3, 1819. While all of its history and tradition is preserved, the visitor comments upon the newness of the city, and it quite commonly is called "the most modern and model city in the South." As the capital of the state, the city is the fifth within the commonwealth to hold the honor and bids fair to be the last.

Being the capital of Alabama has carried a curse in some instances, two cities—St. Stephens and Cahaba—having become extinct since they ceased to be the seat of state government. St. Stephens, which was the seat of government of the territory of Alabama, has disappeared from the map. The present county seat of Washington county bears the name of the territorial capital and is near the site of the old St. Stephens, but is not the same place. In

February, 1807, Aaron Burr, then a fugitive, charged with high treason, was arrested near St. Stephens. He was carried to that place to prison and from there set out on his journey to the court before which he was tried on the charge of treason. There is a story common in that section that Burr cursed St. Stephens as he left it, and that the blight of his curse hung over the place until it passed into oblivion.

When Alabama came into the Union Huntsville was the scene of the convention that drafted the constitution and it was here that William Wyatt Bibb was inaugurated as the first state governor. Bibb reported that in the act that admitted the

state into the Union the general government had set aside as site for the capital at Cahaba, where from November, 1820, to 1826, the seat of government was located. Then the capital was moved to Tuscaloosa. Cahaba no longer exists, having shared the fate of St. Stephens. Whose curse blighted it is not known. To-day the site formerly occupied by the city is a cultivated cottonfield.

In 1845 the question of removal was again brought up and after a vote which favored it, a bill was enacted which called for a capitol building, equal if not superior to the one then in use and that the building should be turned over to the state as a present and the expense of moving borne by the city to which the governmental offices were to be taken.

Montgomery won in a vote for the capital city after several ballots and work on the new state house began. There were no railroads at that time and so the archives of the state were packed into 113 boxes, loaded on thirteen wagons and taken to Montgomery. The entire equipment weighed thirteen tons and the expense of moving was \$1,300, which was paid by the chairman of the building committee. Who will say superstition existed in that instance?

Three years later, in 1847, the building was destroyed by fire. The senate



Golf links of the Montgomery Country Club, where tournaments are played each year by the Southern Golf Association

dend rate of \$60 a share on its common stock.

The General Motors Co. of New Jersey has sold during the seven months ended Feb. 28, 1917, 95,533 cars and trucks, as compared with 73,057 cars and trucks for the same period a year ago.

The gross sales for these two periods are respectively \$102,930,670 and \$86,675,713, and undivided profits for common stock are \$16,000,984 for the last seven months as compared with \$14,991,979 for the seven months ended Feb. 29, 1916.

A quarterly dividend of 1½ per cent on the preferred stock has been declared by the General Motors Corp. of Delaware. The dividend is payable May 1 to stock of record April 12. The preferred dividend of the New Jersey company is 3½ per cent, payable May 1 to stock of record April 12. The amount of preferred stock now outstanding is \$19,980,300, and common stock \$82,559,000. In other words, practically all of the authorized amounts of these two issues are outstanding, having been issued in exchange for the stock of the General Motors Co. of New Jersey, the terms of which already have been announced.

During the first four months of the current fiscal year the company earned about 10½ per cent on the new common, or at the annual rate of over 30 per cent. As these four months constitute the light season in the trade, no barometer can be accepted as to what may be expected for the entire 12 months.

Predictions are made that General Motors will show net profits for the year to end July 31, 1917, of between \$35,000,000 and \$40,000,000, or about 40 per cent on the common.

MENOMINEE PRICES INCREASED

Menominee, Mich., March 12.—Increases in price on five models of Menominee trucks have been announced by the Menominee Motor Truck Co. The increases are as follows: Model EW, formerly \$1,295, now \$1,425; Model FW, formerly \$1,575, now \$1,790; Model H, formerly \$1,775, now \$2,050; Model D, formerly \$2,240, now \$2,475; Model G, formerly \$2,775, now \$3,275.

DORRIS CO. REORGANIZES

St. Louis, Mo., March 9.—The Dorris Motor Car Co., this city, has reorganized and the capital stock was increased from \$300,000 to \$1,000,000. W. R. Coleord succeeds H. B. Krenning as president. Mr. Krenning, together with G. P. Dorris and Webster Colburn, who have been associated with the company, will retain their interests. The new board of directors includes W. R. Coleord, Frank C. Thompson, I. C. Muckermann, George P. Dorris, and Webster Colburn. The officers of the company are W. R. Coleord, president; G. P. Dorris, vice-president; Webster Colburn, treasurer, and A. C. Schmid, secretary.

Used Cars to Have Show

Chicago Dealers Will Stage Exhibition in Coliseum
May 5-13

Auction May Be Part of Proposed Selling Display

CHICAGO, March 13.—A motor car show devoted exclusively to used cars is the latest of the unusual solutions of handling the second-hand car problem proposed by Chicago dealers. The Coliseum, which has been the scene of the annual motor shows, is to be filled May 5-13 with used cars by the Chicago Automobile Trade Association. Not a single new car will be among the several hundred exhibits, and cars will be sold direct from the floor. It is probable that some of them will be disposed of at auction. The used car show will be under the direction of a committee of dealers headed by Erwin Greer, Ford dealer. The project was announced last night at the annual election and banquet of the trade association.

More than 1100 members of the Chicago Automobile Trade Association turned out last night at the biggest gathering of any one local industry ever held in the city. The entire Bismarck Garden was turned over to the Chicago tradesmen. There were two toastmasters. Among the speakers were Judge Sabath, formerly of the Chicago Speeders' Court, and Michael Flaherty of the Board of Local Improvements, who spoke on the means for relieving congestion of traffic in the city. Henry Paulman of the Pierce-Arrow talked on the \$60,000,000 bond issue in Illinois, one of the main projects of the good roads enthusiasts of the state.

This banquet, so far as known, is the first ever to have been managed directly from the speaker's table by wire. The three orchestras and the twenty-four entertainment numbers were called into action at the far end of the big room by telephone.

New officers and directors were elected as follows: President, Joseph F. Davis, Winton; vice-president, C. R. Dashiell, Dodge; secretary, W. G. Tennant, Oakland; treasurer, Henry Paulman, Pierce-Arrow; directors, H. M. Allison of Packard, W. J. Boone of Moline-Knight, Howard F. Gardner of Willard, B. C. Buxton of Liberty and J. W. Maguire of Republic Rubber Co.

NEW MERGER IN INDUSTRY

Detroit, March 12.—The Detroit Motor Car Co. will be taken over by the Detroit Motors Co., a new \$4,000,000 corporation, this week in company with two motor car parts companies. The names of the parts companies are at this time being withheld from the public, owing to details yet to be completed. Plans have been made for the expansion of the Detroit

output, and it will be increased from 2000 to 5000 cars yearly.

J. S. Kuhn, New York banker, has been active in the financing of the new company and will be vice-president. A. O. Dunk, president of the Detroit Motor Car Co., will be chairman of the executive board of the new corporation. W. R. Bamford, vice-president of the old company, will be president; W. L. Heuser will be re-elected secretary. W. L. Van Deusen, sales manager, and R. T. Yeats, director of export sales, will continue with the new company in the same capacities. Election of officers and completion of details will take place in New York on March 15.

The Detroit company came under the direction of Mr. Dunk in July, 1915, and comprises a plant of 150,000 sq. ft., which will be increased to 600,000 sq. ft. The company expects to purchase land in Detroit and build a factory of 800,000 sq. ft.

SECURES \$60,000,000 BOND ISSUE

Hartford, Conn., March 9.—All the property and other assets of the Hartford Rubber Works Co., Hartford, Conn., a subsidiary of the United States Rubber Co., are listed in the big mortgage deed given by the rubber corporation to the Central Trust Co. of New Jersey as security for a \$60,000,000-bond issue recently authorized by the corporation. The bond issue will pay off the indebtedness of the corporation, with the exception of \$9,000,000 General Rubber Co. debentures and \$2,600,000 Canadian Co. bonds. It also will provide working capital. While the transaction affects the Hartford Rubber Works Co. only in a legal way, it practically means the local works are transferred to the Rubber Goods Mfg. Co., a New Jersey corporation and included, with many other subsidiaries of the United States Rubber Co., as security for the bonds. The entire stock of the Rubber Works, as recorded in the deed filed in the town clerk's office, is \$999,000.

4500 DEALERS AT BOSTON

Boston, Mass., March 9.—The annual show here ended to-night with all the dealers and salesmen full of enthusiasm for the spring and summer business. It was predicted by many of the dealers that when June arrives it will be impossible to get a 1917 car from any dealer. "All sold out" will be the statement. Next week several dealers will have their cars on view in their salesrooms, and there will be some small shows.

About 4500 dealers registered during the week. Hundreds of retail sales were made. The wholesale trade was a revelation. Dealers from out of town have been feeling the effects of prosperity, and they ordered freely to protect themselves. As there were some ninety cars shown it should not be an exaggeration to state that the sales of all of them ran up well into the 2000 class. Most sales were in the low-priced

class, though the men handling big cars also made many sales.

The truck sales were very big, too. There was much interest in the truck attachments this year, and many orders for them were taken. And the accessory men did a thriving business. The attendance was a revelation to visitors. On the last three nights the doors had to be closed at times with people clamoring to get in, holding money in their hands. Despite the storm early in the week there was a big crowd the latter part to make up for the slimness the first day so the figures will about equal last year.

The salon at the Copley Plaza was not very well patronized, and some of the out-of-town dealers were a bit disappointed. They figured that they bask in the lime-light of the big show, but they somewhat were eclipsed. But everyone sold a car or two, about enough to pay expenses unless they came from some distance.

There was a meeting here this week of the used-car dealers, who are trying to formulate a plan to get the dealers to refuse to take cars in trade and so have them passed over to the used-car sellers. The matter will be put up to the dealers, but it is very likely that nothing will come of it. The dealers in new cars have built up such a big business in used machines that they would not sacrifice the trade to aid the used-car men.

PEERLESS PRICES HIGHER

Cleveland, Ohio, March 12—The Peerless Motor Car Co. has announced price increases on all but one of its models, to become effective April 9. The new sporting roadster will continue to sell at \$2,250, but the touring car and roadster will be \$110 higher, \$2,090 instead of \$1,980.

CAR PLANT FOR ATLANTA

Atlanta, Ga., March 8—G. W. Hanson will build a factory here for the manufacture of motor cars. His first model will be called Hanson's six. The plant will employ 100 or more men and will eventually turn out 2000 cars yearly. Associated with Mr. Hanson will be Donald Ferguson, an engineer, and Arthur Burdette of Atlanta. Every part of the car that can be built here will be made at the local plant.

UNITED MOTORS DEAL OFF

New York, March 9—Negotiations between the United Motors Corp. and the Brown-Lipe-Chapin Co. have been broken off. The United Motors Corp. will not exercise its option to acquire the factory and business of the Brown-Lipe-Chapin Co. This means that the two concerns will be connected in no way. While it was the impression in the motor trade that the Brown-Lipe-Chapin Co. had actually been acquired by the United Motors Corp., as a matter of fact, the negotiations had never progressed beyond the point of an option to purchase the Brown-Lipe-Chapin Co.

Western Dealers Visited

N. A. C. C. Manager Reports Coast Conditions Similar to Eastern

Used Cars and Freight Shortage Are Problems There Also

NEW YORK, March 8—Closer touch and better understanding between Pacific Coast dealers and the manufacturers is expected as a result of the visit to the coast of Alfred Reeves, general manager of the National Automobile Chamber of Commerce, Inc., the association of motor car manufacturers.

Mr. Reeves presented a comprehensive report to the N.A.C.C. on his visit, and while the report is not made public, apparently Mr. Reeves received many complaints from sub-dealers on the Pacific Coast who, according to their ideas, have not been well protected in certain matters. Perhaps the most important thing obtained by Mr. Reeves was that of getting the impression of the Western dealers and also giving them the thoughts of the Eastern dealers. It is known that the N.A.C.C. has during the last year done considerable work among dealers in getting service organizations in several cities and also with regard to the question of handling spare parts and co-operative insurance.

Mr. Reeves thinks the second-hand car situation one of the biggest subjects dealers have to handle at the present time. He believes the used car problem is little worse on the Pacific Coast than any other place. In eastern sections of the country dealers have used market reports for valuing used cars more than on the Pacific Coast, but the coast dealers are planning to put into use schemes for a more active valuation of used cars. It is possible that San Francisco will start in the near future some form of co-operative used car motor mart.

The Pacific Coast show, held in San Francisco, was, Mr. Reeves believes, the most representative get-together of dealers west of the Rockies ever held. Not only did all dealers in that section attend, but there were many from states east of the Rockies.

At present the Pacific Coast territory is suffering severely from a motor car shortage. This is largely due to a shortage of railroad cars. General industrial conditions are normally prosperous on the Pacific Coast but not abnormally prosperous as are conditions east of the Mississippi river. The fishing industry on the Pacific Coast is especially prosperous, and every day a special trainload of fish leaves the coast for Chicago and New York. Last year the orange crop of California was one of the best. The lemon crop in the same state was larger than previous crops. The nut industry is growing rapidly in that state.

The fuel situation is not so serious on the

Pacific Coast as in other sections, largely because there is much gasoline coming in from Mexico. Another situation which helps the gasoline problem is the general use of distillates by many trucks. Gasoline sells at 21 cents a gallon and distillate at 11. The Moreland was one of the leaders in the use of distillate.

A fuel problem gives promise of some difficulty on the northern part of the Pacific Coast in states where it is not permissible to sell gasoline of a gravity under 60. Such legislation naturally works to the injury of the fuel situation rather than benefiting it. It is well known that a gallon of crude will not yield nearly so much gasoline of 60 gravity as of 56 or 54 Baume'. The East has been using gravities under 60 for several years, and as a result the quantity of fuel from a given supply of crude is correspondingly greater.

MAY SCORE STANDARD OIL

Washington, D. C., March 13—Special telegram—The long deferred report of the Federal Trade Commission's investigation of increased gasoline prices will be made within the next two weeks, according to reliable information to-day. While Government officials are reticent about conclusions arrived at by the commission, it is said that the report will score the Standard Oil Co. on the ground that Standard's thirty constituent companies have not been wholly dissolved, despite the Supreme Court decree. This condition is said to be a big factor in increased prices because of the control of markets.

NEW HIGHWAY ASSOCIATION

Springfield, Ill., March 10.—If multiplicity of good roads associations has any bearing on quality of state roads, Illinois should be a banner state. The latest of these is the Illinois State Automobile and Good Roads Association formed here this week. It is indicated that the organization may effect a merger with the Illinois Automobile Association, which has been in the state of silence for several years. Representatives of sixty-four motor truck and highway organizations were present.

For the present the chief purpose of the new association is to get behind the movement for good roads in Illinois and to support the Illinois Highway Improvement Association's platform, which calls for a \$60,000,000 bond issue, an increase in motor car license fees and appropriation to meet the federal aid law.

OVERLAND INCOME \$17,529,689

Toledo, Ohio, March 12—The net income of the Willys-Overland Co. in 1916 was \$17,529,689, according to the annual report issued by the company to-day. Of the net income, \$10,016,420 represents the net earnings and \$7,963,970 the premiums received on securities. Profits amounting to \$1,318,665 on shipments to distributing branches which were unsold Dec. 31, 1916,

are not included in the net earnings. Deducting fixed interest charges of \$450,702, the report shows the net earnings of the company to be \$9,565,718.

After providing for dividend requirements of 7 per cent on preferred stock, the balance of \$16,479,689, including net earnings and premiums received on securities, equals about \$10.40 a share on the 1,570,776 shares of common stock of \$25 par value outstandings. Increased dividends on both preferred and common stock were declared during the year. The company also sold capital stock, which greatly increased its capital on which dividends are paid, late last fall and while including this in its capital has actually had no results from the earning power of this money, since it was used for expansion purposes and had no opportunity to show profits until after the expiration of the fiscal year.

TO DIVERT PARK SERVICE

Washington, D. C., March 10—Secretary of the Interior Lane has announced the appointment of Stephen T. Mather as director of the national park service and the selection of E. C. Bradley of San Francisco, Cal., to succeed Mr. Mather as assistant to the Secretary of the Interior. The taking up of the work, actively, of director of national parks by Mr. Mather should be of keen interest to every motorist in the United States, as he has during his incumbency of the office of Assistant Secretary given to the question of good roads through the national parks enthusiastic attention.

Not only has Mr. Mather done much to aid the cause of good roads, but he has arranged various routes through the parks to give the tourist the finest possible scenery during his stay in the reservations. Now that he is free to devote all his time to the national parks, these reservations are expected to become more and more interesting to motor tourists of this country.

Three Sunbeams Assured

English Factory Will Be Represented at Indianapolis
May 30

Decision as to Sending Two Fiats
Still Pending

LONDON, England, March 7—Special cable—Three Sunbeam racing cars will represent the English factory at the Indianapolis sweepstakes May 30. These cars will be driven by Christiaens, Rickenbacher and Van Raalte.

The decision of the Fiat company in regard to sending two cars to Indianapolis is still pending, but is considered very likely to be favorable. W. F. Bradley, European correspondent of MOTOR AGE, who has been instrumental in obtaining the cars, expects that they will start in the race. It is expected that the drivers for these Italian cars will be Jack Scales and Enrico Cago, who won renown when he captured the Targa Florio cup.

STANDARD ESCAPES TORNADO

Newcastle, Ind., March 13—The tornado which hit this city on the night of March 11 failed to touch the plant of the Standard Motor Parts Co., and no delay in shipments has been occasioned.

RESTRICT CHICAGO PARKING

Chicago, March 13—Further restriction of parking privileges and parking spaces in this city were made by the city council today in the passage of two ordinances designed to relieve traffic congestion and facilitate street car transportation in the downtown district. One ordinance prohibits the parking of vehicles in the loop district between 7 and 10 o'clock in the

morning and between 4 and 7 in the evening. At present vehicles may stand for 30 min. anywhere in the loop from 6 a. m. to 7 p. m.

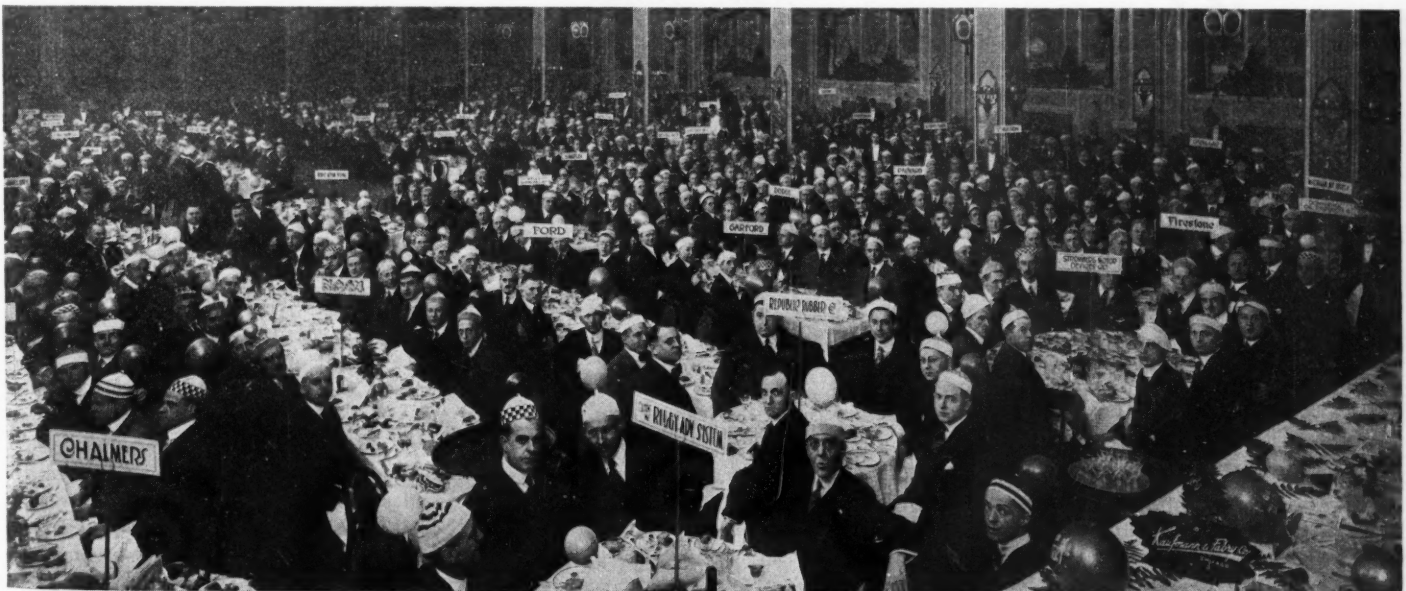
The object of the new regulation is to clear the street car tracks of traffic by giving more space beside the track for vehicles. The other measure establishes loading zones at the principal street intersections to enable passengers to get on and off street cars. Within these zones, which extend 100 ft. from the corner lot line, parking of vehicles is prohibited.

TRACTOR DRIVES LIKE HORSE

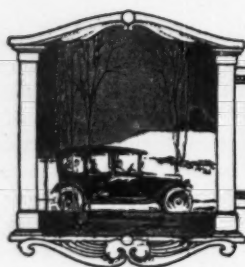
Chicago, March 13—The modern army horse, a tractor utilized in the army enlistment campaign in Chicago as the tractive power for heavy cannon, as illustrated in MOTOR AGE issue of Feb. 15, is equally well adapted to the more peaceful pursuits of agriculture, according to the Line Drive Tractor, Inc., Milwaukee, Wis., the manufacturer of the tractor. This has several novel features, one of which is that it has but two wheels and the other that it is operated by a pair of lines, started, stopped and guided just as a team of horses would be.

OLDFIELD READY TO RACE

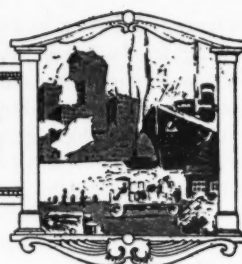
Chicago, March 13—Barney Oldfield this week added another trophy to his collection, a gold medal presented by the Speedway Park Association of Chicago. Barney is planning to leave Los Angeles next week for the East. He has two new cars, one for speedway competition and a 300 hp. car equipped with a twelve-cylinder aviation engine, which will be used on dirt tracks and in an attempt to shatter the world's straightaway record. The smaller car, which he will enter in the Chicago Derby June 9, weighs only 1600 lbs. and is driven by a special aluminum engine, cast solid and with pistons and connection rods inserted and removed from the bottom.



Scene at dealers' banquet at Bismarck Garden, when more than 1,100 members of the Chicago Automobile Trade Association dined together



EDITORIAL PERSPECTIVES



Where Shall We Park?

THE passage of two worthy ordinances this week by the Chicago city council designed to relieve traffic congestion and facilitate street car transportation in the downtown district, brings most acutely to Chicagoans and visiting tourists the question propounded on this page last week under the heading above. Traffic conditions in Chicago are such that there really is not room for carrying the current of vehicles in the downtown streets if this current is impeded and its course narrowed by vehicles standing along the curb.

ALSO, due to the traffic congestion, it has become dangerous for street car passengers alighting and boarding cars in the business territory. From broader standpoints, therefore, the two new ordinances are commendable. One of them prohibits the parking of vehicles in the loop district during rush hours and the other establishes loading zones at the principal street intersections for street car traffic, and vehicle parking is prohibited for a distance of 100 ft.

MOTORISTS cannot help but agree that these, or similar, restrictions to the parking of vehicles have become necessary; but it seems that the city fathers in this municipality, as in most of the others, stop before their work is completed. They ban the motor car from certain districts but provide no alternative places for the motor car to park. They close practically the chief space

for leaving vehicles within the downtown districts during business hours and force the business man who motors to work, the motorist shopper and the tourist either to leave their cars outside of the business district or, in this particular city, take advantage of the two municipal parking spaces which are handy only to a comparatively small proportion of those who must needs use it.

THERE are many other cities whose motorists are not so fortunate as to have had a public parking space provided, and in these cities the problem is the more severe one. Public spirited officials, both in Chicago and in some of the other large cities, are seriously considering the proposition of underground garages in which cars may be stored during business hours at a nominal fee. Such an arrangement can be a solution only in part, because the area which such a garage could accommodate handily would be too small to relieve the situation as a whole to any great extent.

IN other cities, the possibility of numerous small garages scattered throughout the business district presents itself. In most cities where this is possible from a geographical standpoint, property values are usually so high that daily storage rates would be almost prohibitive to the motorist of average, or less than average, income. There are many minds being put at work on this problem, and it is to be hoped that a solution will be forthcoming before long.

The Used Car Show

CHICAGO dealers are going to conduct a used-car show. Several hundred cars, every one of them used, are going to be racked up attractively in the big coliseum and sold off the floor—some of them under the hammer. It is the spring clearance sale for the winter holdovers and is a move in the right direction. The dry goods man, the furniture man, the haberdasher, the milliner, all clean out their shop-worn stock when the season is about to change. The same cleanout should be practical to the motor car dealer.

used-car show to wipe out a good share of this expense. And it does its business thoroughly.

ANOTHER thing it should do. It should awaken people to the bargains found in used cars. It should teach the people of a community the places where they can go to find used cars. Cars are taken in trade for what they are worth. The dealers have a more or less standard ratio of used-car value for different

makes and models. It is their purpose to dispose of these cars in a manner that will protect themselves rather than net them a profit, and the result is that there are real bargains. A reputable dealer will not sell a used car for more than it is worth, and this show will possibly convince the public of this fact. The advertising value of the show, in this regard, is certainly a noteworthy factor.

HAVING saved the dealer money and cleaned off his floors for the spring-selling drive, the used-car show well may justify its holding. Dealers are realizing more the problem of properly disposing of used cars, and the show is as yet a new venture. If this exhibition proves as successful as there is reason to believe it will, the dealer will have come that much nearer the solution of one of his most important problems. The Coliseum calls for big business whenever used, and if this exhibition follows the precedents, it will fill all the ambitions its sponsors have created for it.

NEXT WEEK

How the wounded on the Italian-Austrian front are moved from the firing line to the dressing stations and base hospitals will be graphically told in Motor Age next week in W. F. Bradley's "Italy's Ambulance Service." Mr. Bradley served four months in the Italian ambulance service and writes from knowledge gained through actual participation in this grim work of moving the maimed from the field of war with shot and shell bursting over these workers in the ambulance service. The story will be illustrated by photographs taken by the author and passed by the Italian censor.

THIS show should do two valuable things for the dealer. It should save him money and clean off his floors to start the spring-selling drive with a clean slate. To the dealer whose available floor space is limited this business of clearing out used cars will be a valuable asset for spring sales. The sight of a motley assortment of old models intermingling with the new cars is not harmonious, and there is no question that an atmosphere of newness and concentration on new-car sales has a good psychological effect on the prospective purchaser.

WHEN one considers the time consumed by salesmen making frequent trips with prospects to the used-car room, the space taken up by these cars, the advertising expense and incidental overhead in disposing of them, no small sum of money is sunk before the used car finally leaves the floor. It is the business of the annual

Elgin Road Race Date Set

Indianapolis Speedway Will Have No Races in Case of War

CHICAGO, March 12—Prospects for resumption of the annual Elgin road races this summer are brighter than they have been for two years. The classic was abandoned last year, and until recently it was thought it could not be resurrected. However, following a conference between the directors of the Elgin Road Racing Association and representatives of the Chicago Automobile Club, most of the obstacles have been overcome. Sanction has been granted by the American Automobile Association for Aug. 18 as the date for the event. Several of the speedway associations have given assurance that they will enter racing cars under their control.

SPEEDWAY PROMISES WAR AID

Indianapolis, Ind., March 12.—There will be no race at the Indianapolis Motor Speedway this year if the United States becomes involved in war with any foreign power. James A. Allison, secretary-treasurer of the speedway, declared last week in an address before a meeting of business men that it would be unpatriotic for the speedway to stage a race which would call for the waste of rubber, oil, gas, steel and the services of expert mechanics when the resources could be utilized to advantage by the Federal Government. Mr. Allison said the shops and mechanics at the Speedway, which are used for the development of racing cars, would be given over to the use of the government in case of war.

RACERS JOIN CHEVROLET

Los Angeles, Cal., March 8—Eddie Pullen, Mercer racing driver, is to become identified with the Oakland, Cal., factory of the Chevrolet company. He is here now and says he has not decided whether he will quit the racing game entirely or not. T. J. "Frenchie" Beaudet, one of the best desert and road race drivers in the country, has joined the Chevrolet.

ROAD BOOSTERS AT SPRINGFIELD

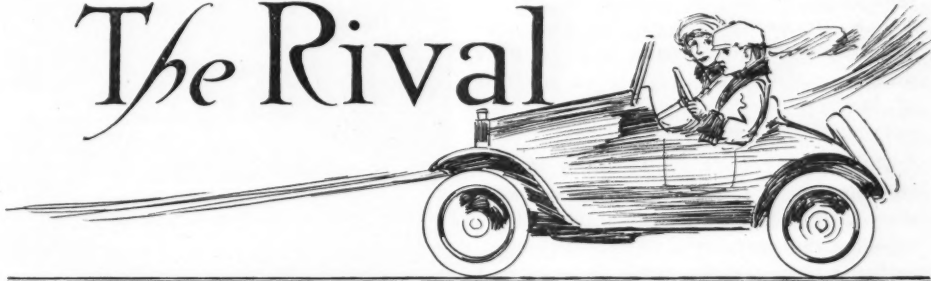
Springfield, Ill., March 13—Special telegram—Several hundred Illinois good roads enthusiasts are meeting here to-day to lend support to the campaign for pulling Illinois out of the mud through the affirmative action of the legislature in voting a \$60,000,000 bond issue for permanent highways. State officials and leaders in the Illinois legislature are in attendance. Fostered by the Illinois Highway Improvement Association, championed by Governor Frank O. Lowden, the bonding of the state

for the sum of \$60,000,000 seems likely to be undertaken and carried to a successful conclusion, which means that the next decade will see a network of 4000 miles of permanent roads.

A few years ago it would have been difficult to get an attentive ear to a proposition for roads which included the raising and expending of such a sum of money. To-day all is changed. The public wants the roads, and the question now to be settled is that of the manner in which the bonds shall be retired. Three issues are being considered. In some quarters it is felt

that motor vehicles should be taxed sufficiently to retire the bonds. Elsewhere there are champions of the direct tax on real estate. Speakers have shown here this afternoon that a levy of 2% cents an acre would bring sufficient funds, while any reasonable increase in vehicle taxes might not be sufficient. It is felt that since all the people are to benefit all should contribute. To-day's meeting is in the nature of a lobby for the bill authorizing the bond issue, and the method of retiring bonds will be discussed further at public hearings on the bill March 21.

The Rival



I have a rival to my husband's affections.

Before this state of affairs came to pass we had plenty of money to spend—although we were not wealthy. But we enjoyed life. My husband dressed me nicely, we went around together and were very, very happy.

Now it seems that we are always skimped for money, I have nothing new to wear and for whole afternoons he deserts me while he places his time at the disposal of this rival of mine. He is quite flagrant about it.

He no longer buys wines when we go out to some restaurant or cafe, yet he persists in buying measureless quantities of expensive liquors for my hated rival.

I ask for a new frock. He frowns, looks serious and I know he is thinking. "Twenty dollars for a frock—why that will almost buy—." And I do not get the frock. In a day or two, however, my rival sports some new "necessity" as he would call it.

And I cannot look in a milliner's window without tears of despair in my eyes. The shoe shops fill me with unquenched longing. Silk stockings grace my slender limbs no longer.

He no longer brings me flowers even upon anniversaries.

He even forgot my birthday completely, although in the forenoon I chanced to hear him ordering something over the phone for my rival which cost more than many modest presents.

I am no longer first in my husband's affections—

Since he bought an *Automobile*.



Mexico Lifts Import Duty on Cars

Tax Which Practically Prohibited Shipment of Motor Vehicles Over Border Removed

LAREDO, Tex., March 9—The de facto government of Mexico has just issued a decree which went into immediate effect removing the import duties on motor cars and all other motor vehicles. This action is regarded as of the greatest importance to car dealers, particularly those located in towns upon and adjacent to the border.

Several months ago the Carranza government increased the import duties on cars and accessories to what was practically a prohibitive figure and what little trade was being carried on with that country in these lines was immediately discontinued as a result of the exorbitant tax. Immediately upon the promulgation of this new decree, removing the import duties, dealers in Laredo, Brownsville, Eagle Pass and other border points which have open railway communication with the interior portions of Mexico, filled orders that have been pending for a large number of cars.

The first day when the notice of the decree was received here, twenty cars were shipped into Mexico at this point. It is expected that as a result of this duty abrogation a considerable trade in cars and other motor vehicles with Mexico will be carried on.

CARS BY STEAMSHIP

Toledo, Ohio, March 10—To relieve the railroad congestion and transport motor cars from the factories at Toledo and Detroit to the agent and consumer, the Interlake Auto Transportation Co. has been incorporated with a capital of \$100,000. The incorporators are William M. Richards, Oscar J. Smith, Bernice Swisher, Myrtle Hotchkiss and Helen Skidmore. The passenger steamer, "Huron," owned by the Star Cole Line of Detroit, has been purchased. The boat will be used exclusively to carry motor cars.

AMCO CAR IS PLANNED

New York, March 9—Cars adapted to foreign use will find a big market in Europe, according to the American Motors, Inc., exporters. This company was formed recently to serve the makers in their foreign business by a comprehensive plan of co-ordination, embracing every step in the transfer from the American maker or sell to the foreign buyer of motor car products.

With this point in view the American Motors, Inc., has decided to increase its

scope by invading the manufacturing field with an assembled car called the Amco. This branch of its business will be carried on in conjunction with its export service and will be under the direct supervision of the present officers.

The company's designer, D. M. Eller, is now experimenting with a car particularly adapted to foreign use. For instance, the radiator will be much larger than the standard sizes. The company is using a 4-in. core Mayo radiator, which, it states, will eliminate much of the overheating troubles of American cars in certain foreign countries.

Though the specifications have not all been decided upon, it is known that a four-cylinder Continental engine will be used and that the car will be designed to em-



Scenes from the inauguration give us these pictures of warlike motors. Above part of the armored motor battery of the New York national guard passes, while below a machine gun mounted on a Ford goes by

brace most of the European standards as well as the American.

The company has forty-one foreign branches to take care of this business and already has received many inquiries for agencies in the United States.

Mr. Eller has made a special study of the European needs. His plan is to build only the chassis and to ship them knocked-down to economize on the shipment rates and to cut down much of the extra cost on the chassis after it reaches a foreign port. He states that the body work will be taken care of through the branches. Mr. Eller will visit Europe as soon as the war stops, when he will line up his branches to take care of the 7000 or 8000 cars he expects to produce at maximum production.

No definite plant location has as yet been decided on. The company, however, will establish its plant on the Atlantic Coast.

\$4,000,000 WORTH OF TRUCKS SOLD

Detroit, March 9—The Packard Motor Car Co. sold more than \$4,000,000 worth of motor trucks in January and February. None of these were for foreign shipment.

CHICAGO DEALER DIES

Chicago, March 13—Clinton A. Hamilton, general agent for the Allen car, in Chicago territory, died yesterday in Chicago. Hamilton for years was identified with the Brown Corliss Engine Co., at Corliss, Wis., as general manager, later becoming president of Racine Mfg. Co., builder of motor car bodies, then manager of Lavigne Gear Co. He came to Chicago two years ago.

HOOSIER REORGANIZES

Dunkirk, Ind., March 9—The Hoosier Sub-Carburetor Co. has reorganized and will move to Indianapolis, Ind., this month. The company has increased its capital from \$10,000 to \$25,000. The officers are: E. W. Steinhart, Indianapolis, president; George Black, Dunkirk, vice-president; C. W. Smalley, Dunkirk, treasurer; F. H. Hoover, Indianapolis, secretary, and J. W. Fudge, general manager. The company is reducing the price of its carburetor for Fords from \$10 to \$7.85.

SALESMEN IN MILEAGE CAMPAIGN

Philadelphia, Pa., March 12—John Lucas & Co., Inc., paint and varnish makers, have been conducting a selling campaign in which they use the system being employed by the Packard company, that is, placing their salesmen on a mileage basis and using the Lincoln highway as a route. Each sale is credited so many miles and the highway map shows a Philadelphia salesman as having crossed the continent and being half way back on the return trip. The Lucas campaign has been in progress since last August.

Palmer Tube Has Imbedded Webbing

New Method Prevents Blowouts by Restraining Pressure from Injured Casing

CHICAGO, March 12—It has been a great many years since the inner tube for pneumatic tires has been expected to serve as anything other than a flexible container for the fluid air, around which there must be a more rigid casing, designed to prevent excessive and uneven expansion of the tube under the pressure of this contained air. The present disadvantages of the conventional pneumatic tube lie chiefly in the fact that the casing is subjected to the heavy air pressure within the tube as well as to the other strains incident upon its use as a wear resistor for the tube, and a means of transmitting the motor power to the road surface. The fact that the pressure in the tube is transmitted to the casing means that in the case of a cut or other damage to the casing the tube tends to force into the weak spot so that the very pressure of the air itself makes the damage worse, with a blowout as a final result.

To clothe the air tube with a restraining fabric has been one method which was attempted, but without success, until the puzzle was solved in the Palmer cord tube, a tube of pure para rubber, lined with a sea-island fabric knit on a double curve, which permits an air tube to be built so that it fits the casing perfectly. Until a weakness develops in the tire casing this tube acts as an air tube pure and simple, except that the fabric limits its expansibility so that it cannot be distended beyond a certain point by the air pressure, therefore

doing a portion of the duty of sustaining the air pressure and relieving the casing of a proportionate amount of strain. In the event of damage to the casing, such as a cut, which does not injure the tube but ordinarily would cause a blowout with the conventional tube, the Palmer cord tube simply bridges across the cut, the tube itself holding in pressure.

Older tire men will remember that back in the nineties the old Bartlett tire, brought out very shortly after the original Dunlop, in which it was first attempted to re-inforce the air tube of the pneumatic tire with a strengthening material to help in holding in the pressure. But until J. R. Palmer invented the cord tire and developed this new tube the method did not prove successful. The fabric used in the tube is a web similar to that comprising the flat cord of the new Palmer cord tire mentioned last week. It is manufactured by the Palmer Tire & Rubber Co., St. Joseph, Mich., and it is Mr. Palmer's belief that, though the tubes are somewhat more expensive than the present types, they will cut the tire cost of driving by one-half.

A NEW TRUCK ATTACHMENT

Los Angeles, Cal., March 8—The Le Munyon & Bidelman Co. has been organized to manufacture a universal attachment for converting passenger car chassis into commercial vehicles. Construction already has been begun at Alhambra, a suburb of Los Angeles.



The hero rescues the heroine from unknown peril while the moving picture machine grinds merrily. Palm Beach society is acting for the screen. Hector Munn, Washington, D. C., Miss Natalie Johnson, New York and Milwaukee, Wis., and Le Grand B. Canon, New York, appear here. The film was to be shown in the ballroom of the Royal Poinciana for charity

All Fort Dodge Holds Show

Moving Pictures of Cars and Exhibition Proper Display Trade Possibilities in That Territory

FORT DODGE, Iowa, March 10—One moving-picture house in Fort Dodge is showing the Death Valley Dodge this week. Another has a picture of the Hudson on its trancontinental run, while Ford and Willys-Overland factory reels are being featured at other moving-picture houses. But the motor car show business really is most evident at White's terminal warehouse, for there are on display ninety cars, thirteen trucks and three tractors, as well as accessories.

The dealers' association here is holding its sixth show, and it is the best one they have had. It occupies about 30,000 sq. ft. of floor space. The trucks and tractors are in the basement, while cars are on the first floor and cars and accessories on the second floor.

Visitors Want Touring Cars

Forty-one of the cars are touring cars, and sixteen are chassis. The visitors buy the touring cars and want to see the chassis. The decorations are styled Chinese on the first floor and floral on the second. They give color to the warehouse and make it an effective background for the exhibition. No fences mark the exhibits, as this show is more or less of a family affair, and the dealers wanted an open show. Each exhibit has its uniformed attendant, who keeps the cars dusted, picks up papers and is useful generally.

Nearly every salesroom contains an exhibit also, as some of the special models could not be placed in the exhibit. Studebaker is not at the show but has the gold chassis at its salesroom.

Tremain & Rankin, Dodge and Oakland dealers, are giving their dealers special courses on the electrical systems of their cars. There are about thirty-four dealers here.

More than 200 Overland dealers and salesmen attended a banquet given by the Overland Fort Dodge Co. Thursday night. Tremain & Rankin gave a banquet to their dealers Tuesday night. The Knight Motors Co., state agent for the Stearns-Knight, gave a banquet to its dealers Friday night. Nearly every dealer, in fact, had a banquet during the week.

Most of the store windows were decorated for the week. The Boston store had an Overland Country Club model on display, using it as a basis for a clothing advertisement.

Though the dealers in the territory know that there already is one car to every eight persons in their field, they are not discouraged. This is said to be the heart of the prosperous agricultural district of the

Green Bay Exhibits

United States, and even though 8,000 cars have been contracted for, which when sold will bring the rate down to one in seven, the farmers can do better even than that with the present prices on farm produce.

Whether this is the heart of the agricultural district of the country or not, it is the motor car center of northern Iowa. Last year Fort Dodge dealers sold and distributed 17 per cent of the entire number of cars sold in the state of Iowa. They sold 7384 cars. The year before 3971 cars were sold in this territory, so last year's sales show an increase of more than 80 per cent above those of the previous year.

This means that this territory spent \$6,645,000 for new cars last year, assuming the average price to be \$900 a car. If this season shows a gain of 50 per cent, about 11,000 cars will be sold in the territory, a total business of \$9,900,000.

The trading territory reached from Fort Dodge includes twenty-six counties with a total population of 437,464. In 1916 53,764 cars were registered in this territory, that is, one person in every eight now has a motor car. For the rest of the state the average is one in twelve.

But prosperity originates in this part of the country. The total income of the Iowa farmers in 1916 was three-quarters of a billion dollars. The Fort Dodge has a fair share of this income, too. Prosperity lies in the gypsum and clay deposits around Fort Dodge. The slogan of the city well is "We plaster the earth," for five mills turn out annually 460,000 tons of gypsum, valued at \$1,500,000, while 225,000 tons of clay are produced each year, their value being \$1,800,000.

Most of the twenty Fort Dodge dealers are sub-agents and cover from one to the whole ninety-nine counties of the state. The usual territory for a Fort Dodge dealer contains fifteen counties, however.

11,000 AT GREEN BAY SHOW

Green Bay, Wis., March 10—Between 11,000 and 12,000 people residing in North-eastern Wisconsin attended the first annual show given by the Brown County Automobile Dealers' Association March 3-5. It was the second show to be held in Northern Wisconsin during the fag-end of winter under the patronage of the Milwaukee Automobile Dealers, Inc., which fostered a similar sectional exposition at Wausau, Wis., during the week preceding the Green Bay show.

The object of the sectional shows is to create business for dealers working under Milwaukee distributors, whose clientele was not in a position to attend the big Wisconsin show at Milwaukee, Wis., in January. As a retail selling proposition, the Green Bay, Wis., and Wausau, Wis., shows excel in results any show ever held in Wisconsin. Here cars actually are sold and the cash turned over to the dealer.

Fifty-four cars, representing thirty-seven different makes, were exhibited at Green Bay. Fifteen retail firms made exhibits, which were supplemented by eleven accessory and supply displays. The decorative scheme was installed at no expense to the Brown county dealers by the M. A. D., which also furnished a setting for the Wausau show. This consisted of a smaller edition of the decorative plan used at the last Milwaukee show.

LOUISVILLE SHOW NAME CHANGED

Louisville, Ky., March 9—The eleventh motor exhibition to be held in this city will not be styled the Louisville Automobile Show but will be designated in 1918 as the Southern Automobile Show. This change has been decided on by local dealers at the suggestion of men from the North and East who have been attending motor car exhibitions for years and who have placed Louisville's annual show at the head of the list of Southern displays. They declare it ranks first outside the national shows and those staged in motor car manufacturing cities.

FIRST BUSES FOR CHICAGO

Chicago, March 10—By the granting of a twenty-year franchise to the Chicago Motor Bus Co. Chicago is assured of its first motor bus service. The company is authorized to operate on all the boulevards under the jurisdiction of the south park board which granted the franchise.

The park commission is to receive 4 per cent of the gross receipts for the first five years, with a guarantee of \$10,000 annually; 4½ per cent with an \$11,000 annual guarantee for the second five years; 5 per cent with a \$12,000 annual guarantee for the third five years. Two routes will lead from Randolph street and Michigan avenue, one to Marquette park and the other to the Jackson park bathing beach. A third route will connect Marquette park with Jackson park, and a fourth will begin at Garfield boulevard and South Park avenue and end at the Jackson park bathing beach.

Our Orient—New Mexico

Country Around Santa Fe Once Habitation of Pre-Historic Man—April 5 Issue for Details

SO OFTEN the critical tourist, who has been surfeited with the wonders of the old world and knows little of the new, is wont to say: "The United States lacks the atmosphere that age alone can give." If you ever hear anyone say that, remind him of the fact that down in our Great Southwest—New Mexico to be specific—there is a section with the coloring of the Orient, with a setting older than that of Babylon or Damascus, and having something of that intangible air of mystery that the Moors brought from the Far East. Out there, amid the scenic surroundings that must have reminded the builders of their Iberian home, blossomed the city of Holy Faith, the capital of the Sunshine state and the most picturesque city of our country—Santa Fe, a town that often is referred to as "hoary with age."

Pueblo Culture Had Basis

This ancient civilization, however, was built on another one equally picturesque, but a thousand years older. Before this old, old Pueblo culture is a substratum that imagination has pushed back to the very birth of mankind, the cliff and cave dwellers, whose 20,000 cave and cliff dwellings sit at the very door of the city of Santa Fe and puzzle the archaeologist with their well-preserved ruins and remains.

The tourist who knows how to travel will approach Santa Fe with reverent attitude and with proper preparation. To enjoy the quaint, historic city, with its many scenic, ethnologic, historical and pre-historic attractions, one should read something of the city and its surroundings. The city does not thrust itself on the traveler with glittering minarets or lofty spires. One should read Bandelier's "Delightmakers," for example, to catch something of the romance and mystery of the cliff dwellers. Those of you who have read "Ben Hur" should remember that Lew Wallace had not seen Palestine when he wrote his famous book, but drew his pictures of the Orient from the familiar surroundings of Santa Fe.

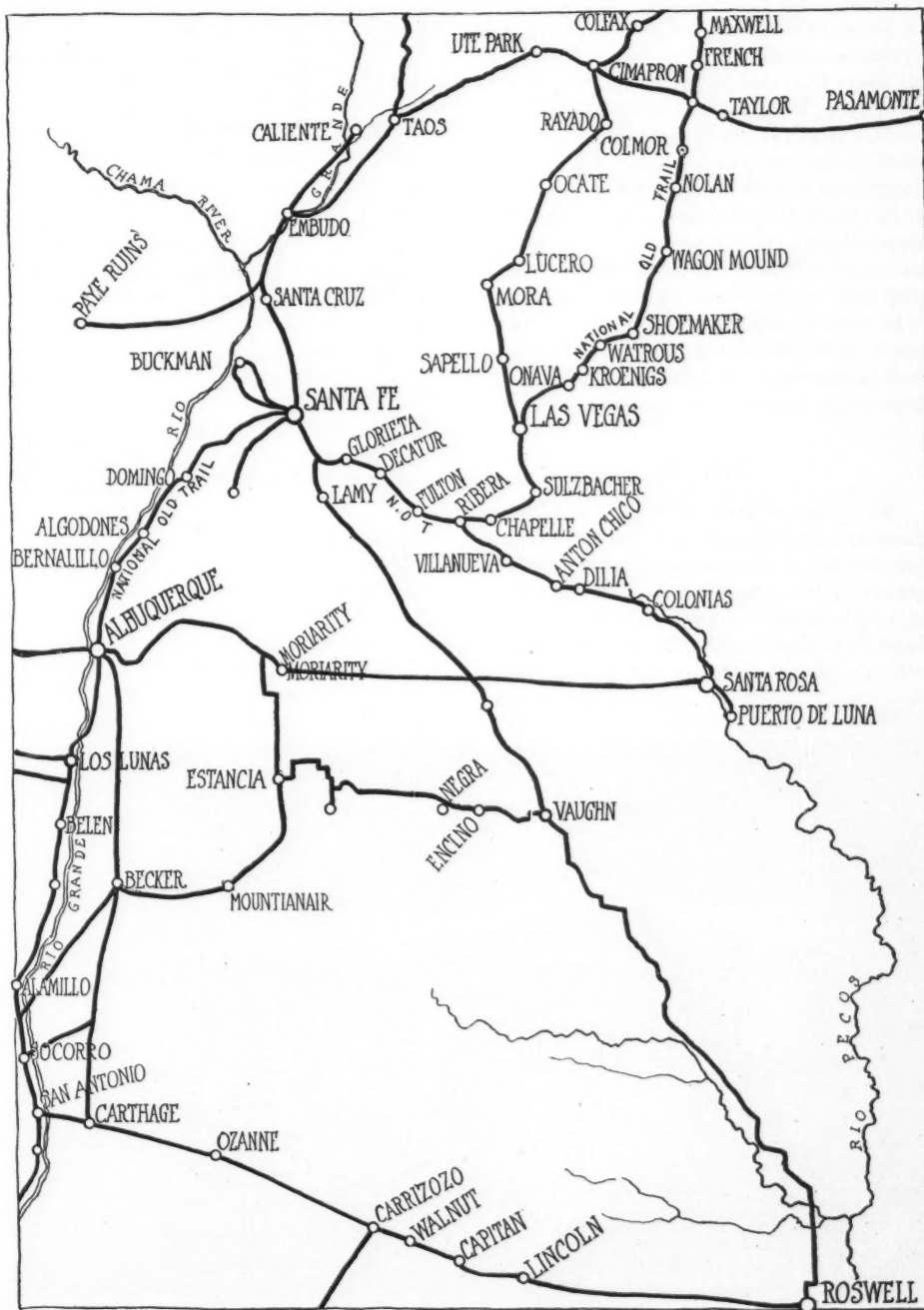
New Mexican scenery is compelling. There is diversity that should offer attraction of the most fastidious. Days might be spent exploring the old cliff dwellings. The first view one gets of the sunset as one ascends the Glorieta divide in the Sangre de Christo range will reveal the reason for the impressive name which translates into "Blood of Christ" mountains. The state is not a network of roads, but it must be remembered that towns are far between and there are great

areas of sage brush country where one main road is enough. The National Old Trails is the main thoroughfare through the northern and central parts of the state and the Southern highway and Borderland trail traverse the southern end of the state.

TOUR AROUND LAKE PLANNED

Chicago, March 12.—Plans are under way for a tour to encircle Lake Michigan

along somewhat the same route as the Chicago Motor Club's reliability run in October of 1912. The proposed run will include three states, will start from Chicago to Michigan City, where it will pick up the West Michigan pike, to Frankfort. Here a steamer will take the tourists directly north to the other side of the lake, to Manistique, the return route being south along the west side of the lake to Chicago.



The map shows the roads leading through this far corner of our country, the Pueblo region

Keeping Your Garage Inside

Suggestions as to Housing Your Car Near the Rest of the Family

If you are particular about your car, why not keep it in the house? This question is not intended as an attempt at being funny but is asked in all seriousness. Furthermore, it embodies a suggestion, and this suggestion is backed by illustrations that actually show instances where just such a plan for housing the motor car has been employed. No home, you know, is today really complete unless it provides for a car, be that home large or small, palatial and costly or humble and inexpensive.

Each of the three houses illustrated here is designed with a garage attached. One of the houses has its garage as a feature of its main-floor level, but in the other two the garage occupies a portion of the basement. It is readily seen that the arrangement is most convenient and also that it constitutes rather an economy in respect to both ground space and cost, especially where there is a ground slope that provides naturally a roomy basement, as is the case with two of the houses shown.

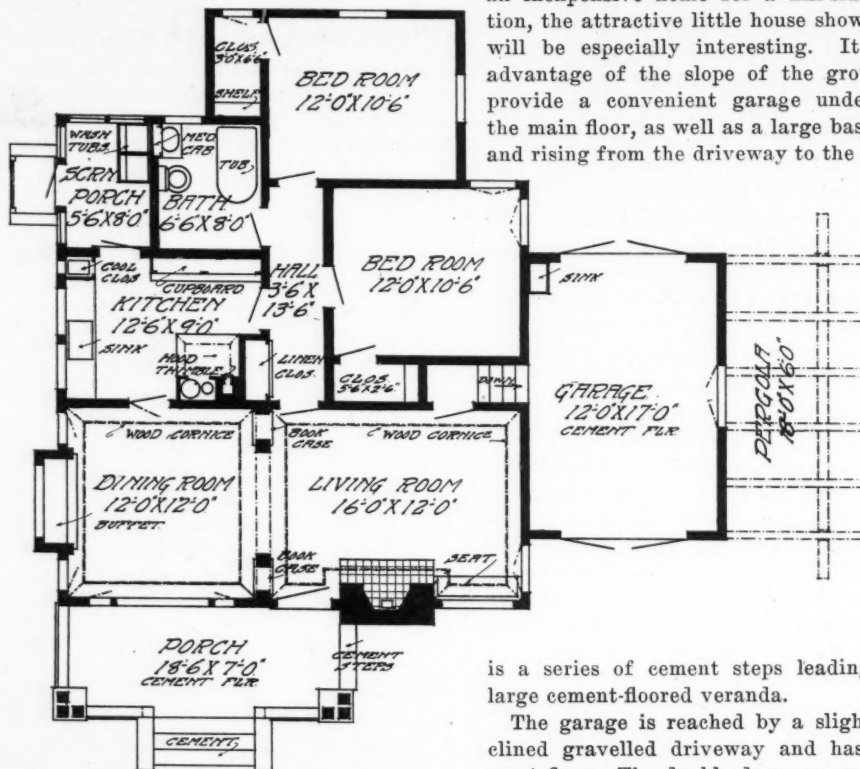
In style of architecture the three houses are widely different, and in cost the range is from \$2,000 to \$4,700. All of them are built in or near Los Angeles, Cal.

No. 1

The garage is attached to one end of the bungalow and is reached from the house's interior by a tiny hall leading off of one corner of the living room. This garage is 12 by 17 ft. in size and is floored with cement. It is provided with double doors in both the front and the rear. Rear doors have small windows, and the interior is

By Charles Alma Byers

further lighted by a pair of casement windows in one of the side walls, along one of which extends a 9-ft. pergola. The garage is entered from the interior of the house through the living room.



The floor plan above shows the relation of the first garage to the rest of the house



No. 1—This garage has double doors front and back. A tiny hall leading off from the living rooms gives access to it from the interior

The cost of this bungalow and garage complete, was approximately \$2,000. It was designed by W. E. Allen.

No. 2

For the person planning the building of an inexpensive home for a hill-side location, the attractive little house shown here will be especially interesting. It takes advantage of the slope of the ground to provide a convenient garage underneath the main floor, as well as a large basement, and rising from the driveway to the garage

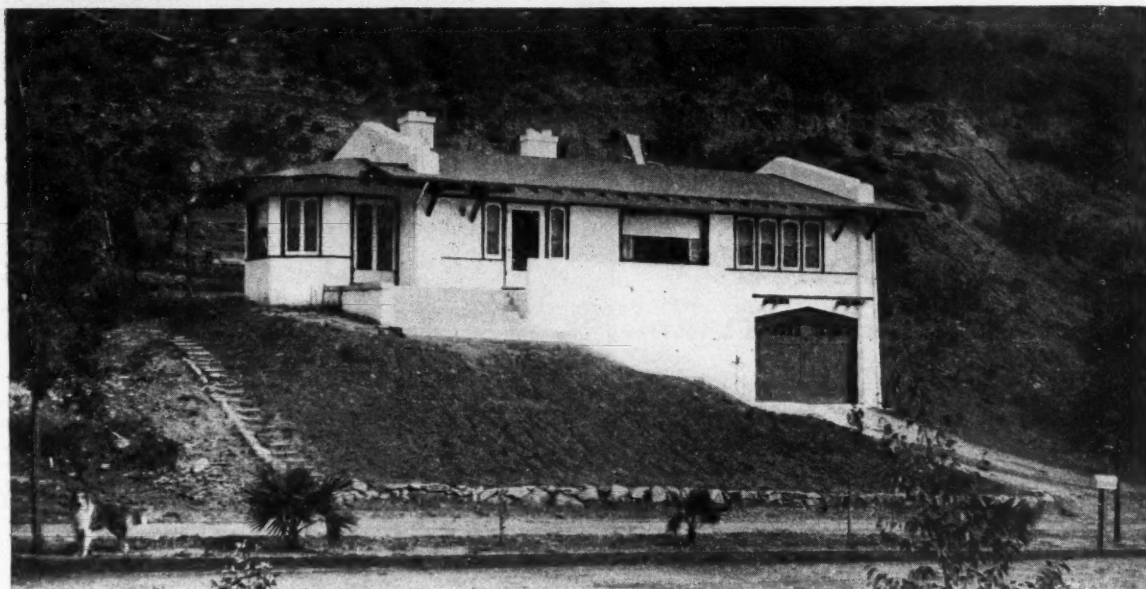
is a series of cement steps leading to a large cement-floored veranda.

The garage is reached by a slightly inclined gravelled driveway and has a cement floor. The double doors are provided with several small panes of glass, and the interior is further lighted by two tiny windows in one side. Partitioned off from the garage is a cement-floored basement where the furnace serves duty for both house and garage.

This bungalow and garage were built at a total cost of \$3,500. They were designed by Paul Arnold Needham.

No. 3

With its all-white exterior, the third house presents a rather classical appearance, and its garage underneath is well planned both for convenience and as an added structural feature. The slightly sloping ground causes the house to be virtually two stories high at one end and only one story at the other. Hence, there is provided naturally an excellent garage location, with a cement-paved driveway thereto that remains practically on the same level as the street in front. Back of the garage, which is floored with cement, there is also room for a large storage room, a



No. 2—Here the indoor garage utilizes part of the basement space. The location of the house on the side of a hill makes that arrangement possible

furnace room and a comfortably finished and furnished maid's room with outside windows and doors. From the driveway rise two flights of cement steps, one leading to the front entrance and the other to the laundry porch adjoining the kitchen.

This house and garage represent a total construction cost, including all modern equipment, of approximately \$4,700. Its designer was Paul Arnold Needham.

OWNERS WOULD CUT THEFT RATE

St. Paul, Minn., March 10—The advance in the theft risk rates, due to the alarming increase in car thefts throughout the country, is causing some dissatisfaction among car owners in St. Paul, Minn., owing to the comparatively clean record the city had last year. Only six stolen cars were not recovered. The percentage of recovery was 98 per cent here, whereas it is 90 per cent in adjacent territory.

Cars reported to the police here as stolen out of town, in Minneapolis usually, numbered 705. Of these 640 were recovered. Owners of cars in St. Paul, however, contend that the protection given cars by the police should figure in determining the risk rates just as protection by a fire department affects the fire insurance on real estate.

Cars costing less than \$800 pay a combined theft and fire insurance premium of \$3.75 a hundred, \$1 more than last year. Three years ago it was 50 cents a hundred. On cars costing more than \$3,500 the rate is still 50 cents, as low-priced cars are stolen more frequently.

OWNER'S LIABILITY STATED

New York, March 9 — A motor car owner is liable for the acts of his chauffeur whether working under the owner's instructions or carrying out his duties under his own volition, according to a decision in the Appellate Division of the Supreme Court, here.

The case involved was that of Mrs. Fan-

nie Rose, widow of Morris Rose, who was run over and killed by the motor car of Harry Balfe, the defendant, while being driven by his chauffeur who took the car out of storage without permission from the owner.

The decision holds that an owner is liable for acts done by his chauffeur in the course of his employment as such, but mere disregard of instructions or deviation from the line of his duty does not relieve the owner from the responsibility. The important point brought out in the case was whether the act was done while the chauffeur was doing his owner's work, no matter how irregularly or with what disregard of instructions.

As the case now stands, where a car is entrusted to a chauffeur's discretion an employer may be responsible for tests undertaken without positive orders. If a chauffeur's discretionary authority to take out a car for whatever purpose is not alto-

gether revoked and cancelled when the car is laid up in storage, with orders that the car is not to be used, then a chauffeur is a dangerous instrumentality, whom the owner maintains at his peril and employer cannot escape liability except by concealment of his car in a secret garage where his chauffeur cannot find it.

According to the decision, the judgment for \$16,912 decided in the lower court, is upheld. The case, however, will be appealed in a higher court at Albany, and will probably come up for argument in about a year.

40 PER CENT FIRST MONTH

Detroit, March 9—The Hayes Mfg. Co., which recently increased its capital from \$625,000 to \$1,500,000, reports earnings of \$55,947 for January. The company, in making public its first balance sheet, shows assets of \$2,192,124.

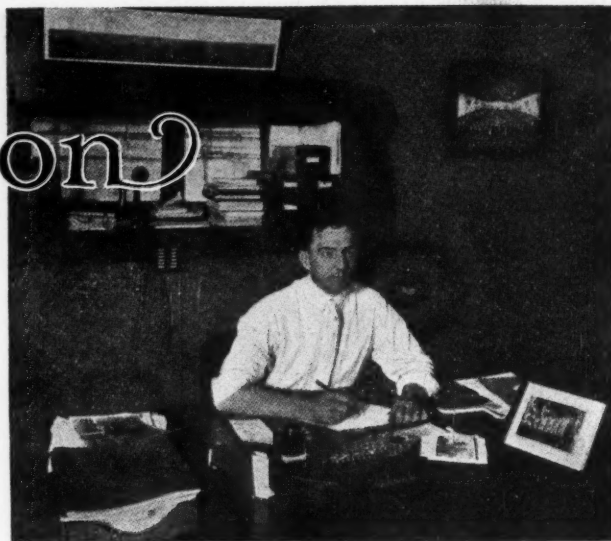


No. 3—Another home with the garage tucked underneath emphasizes the possibilities peculiar to the hillside type of home

3/4 of a Million

for Power-Propelled Vehicle Education

by Wallace
B. Blood



Sweeney, the teacher, in his shirtsleeves

THERE is a building nearly completed in Kansas City, Mo., which will represent an investment of three-quarters of a million dollars, and which is being erected for the sole purpose of housing what is undoubtedly the biggest motor car, stationary-engine, truck and tractor school in the world. When ground was first broken it was considered that a ten-story building on a ground area of 85 by 116 ft. would be ample to take care of the school's needs for some time to come. With only the steel skeleton of this building completed, the increase in business made it necessary to rush the architects for plans of an adjacent building of the same size, doubling the capacity, and within a few days ground will be broken for this structure.

Who Is Doing It?

All this development is being done by Emory J. Sweeney, president and owner of the Sweeney Automobile School, who holds a unique and individual place in the motor industry in that he has a great practical-teaching school in gasoline locomotion. He is to schools what Henry Ford is to building, and incidentally the two are personal friends. But more about Sweeney after I describe the new buildings and what they will contain.

The school at the present time has over 1400 students. Enrollment figures in the last 12 months show 4100 men. And the school has graduated over 11,000 in the last 8 years. These men came from every walk of life and from every state in the Union and from Canada and foreign countries.

The object of the school is to teach the proper care, repair and operation of motor cars, trucks, tractors and stationary engines, and this teaching is entirely based on practical work. There are no text books, and no magazine subscriptions are solicited. At present a force of over sixty instructors is employed in the present school which represents an investment of \$75,000.

A Teacher Makes a Fortune and Admits It

This pair of buildings will have a frontage on the plaza in front of the new Union station of 218 ft. The entire building will be used for the one purpose and will be both a school and a student home. There will never be a cigarette smoked in the building, Sweeney declares, and a smoking room is provided for cigars and pipes. The law says no saloons can be located within five blocks of the Union station and the school is directly opposite the station.

In the basement will be a cafe, reading room, recreation room, barber shop, swimming pool 25 by 50 ft. and shower baths. On the first floor will be the school office, stores for the students on the plaza and a garage and motor laundry. The second floor will contain repair shops and garage equipment. The third, fourth and fifth floors will be given over to machine shops and school appurtenances. The sixth, seventh, eighth and ninth floors will be given over to healthy, airy dormitories for the students. The tenth floor will contain lecture rooms and gymnasium.

4½ Acres of Floor Space

There will be 4½ acres of floor space in the building, and the buildings and ground will cost \$600,000, disregarding the equipment which will be put into them. Sweeney says he is going to have everything in the school which will be found in the biggest general education college in the East. There will be a complete hospital occupying a wing of the ninth floor. There will be a department where cars may be checked by persons going out of town for a few days. And the school is directly across from the station. Sweeney is reciprocating with Kansas City for the mutual benefits derived. There will be a department where women and private owners of

cars will be instructed in the operation and care of these cars.

The building will have a capacity of 3000 students at one time, and there is every reason to believe that it will be but a short time after the completion of the new structure when this limit will be closely approached.

Sweeney attributes the success of his eight-year-old undertaking to the fact that he gives the students a complete course at a fixed price, namely \$85. There are no extras. This tuition pays for everything but board and room. Furthermore, although the length of the course is considered to average about 8 weeks, a student is not turned out at the end of that time.

Chance to Perfect Himself

He may, if he wishes, take his examinations and receive his diploma and then go back into the school and specialize on any line or lines that he wants to and as long as he wants to stay without any cost. Or, after he has gone through all departments he may brush himself up in the work in which he considers himself weak before taking his examination. Or, if he fails to pass the grade of 89, which is based on a list of twenty examination questions, he may perfect himself in the departments in which he failed and take another examination, without any charge from the school.

Classes are started into the school every day, and other classes are graduated every day. Sometimes there are only fifteen enrollments in 24 hrs. Often there are seventy-five. Throughout the present winter season Sweeney has been obliged to run his classes in two shifts, one working from 7 in the morning until 2 in the afternoon, and the other from 2 until 9 in the evening. Of course, two shifts of instructors take care of the day's work. The new building will increase the facilities to permit fifty more students in each of the twenty or more departments.

Now as to the methods by which the students are taught and what they are taught: The new student—might we call

him a freshman?—receives ten lessons or lectures in the assembly lecture room. These lessons are both thorough and elementary. The lectures are based on the principle that the new student is a total novice regarding anything mechanical, and he is given every small root of the construction and repair of power-propelled vehicles in the lecture room before tackling the tree of practical work which follows. These lectures are not all illustrated with charts and drawings. There are cut-away carbureters, magnetos, gearsets and even complete engines and complete chassis.

The student then passes into the blacksmith department and, in practical work, learns all he will ever need in this business. In fact, before he is turned out of the blacksmith department he must forge from the rough a complete set of chisels which must match master patterns and stand a rigid examination as to their accuracy and hardness.

He is then taught vulcanizing in all of its phases and with all different types of apparatus. Oxy-acetylene welding is taught him. It is not a mere matter of teaching either. He must do satisfactory welding without aid before he is led to the next department.

Probably the majority of garages in towns of 5000 people or under are not machine-shop equipped. Nevertheless this is a present condition and the garageman of the future, in whatsoever small a community, will find a machine shop handled by an experienced man a money maker. Sweeney is teaching practical machine-shop practice. He has a battery of lathes, six of them, drill presses, shapers, millers and even a gear-cutting machine. Students can have all the time they want in this department, as they can in every other. When I visited the school last week there was pointed out to me a student operating the big lathe of the shop. He had been at work for three weeks on that one machine, and he was a post-graduate, too—at Sweeney's willing expense.

There is a special and separate department to teach valve grinding. The student really grinds

valves until he knows how. Piston ring fitting, babbitting, soldering, brazing and valve timing are practically taught. When a student enters the valve or ignition timing departments he finds a gang of engines in each, representing all types, and these engines are as completely out of time as the class which just graduated from the department could leave them. It is up to the incoming class to learn how to time and to do the work of timing those engines so that they will run under their own power.

Motor Assembly and Testing

Motor assembling and testing, carburetor and magneto construction, maintenance and repair, magnet recharging, etc., are all thoroughly covered. Starters and all electrical equipment, including the battery, have modern and complete departments in the school. The student is not only taught how to recharge and repair batteries but he also learns the delicate operation of tearing them down and rebuilding them with new separators, jars, etc.

This battery department is one of the most thorough of the school. Here batteries are brought which are in every condition of wreckage and decomposition. Cells dry of electrolyte, plates buckled, separators split, jars cracked and broken. It makes no difference how badly off the battery may be, it is the students' job to put it into first-class condition and charge it to the proper test. There is a steaming oven for loosening the cell covering to permit easy removal; there is a complete

and modern recharging plant with which every student must become familiar.

Back in the electrical department is a new house lighting outfit, one of the Delco products. Electrical house lighting in the rural districts by the compact equipments consisting of a gasoline motor driving a generator is becoming a common thing in the Southwest, and here the farm student can learn the care and repair of these.

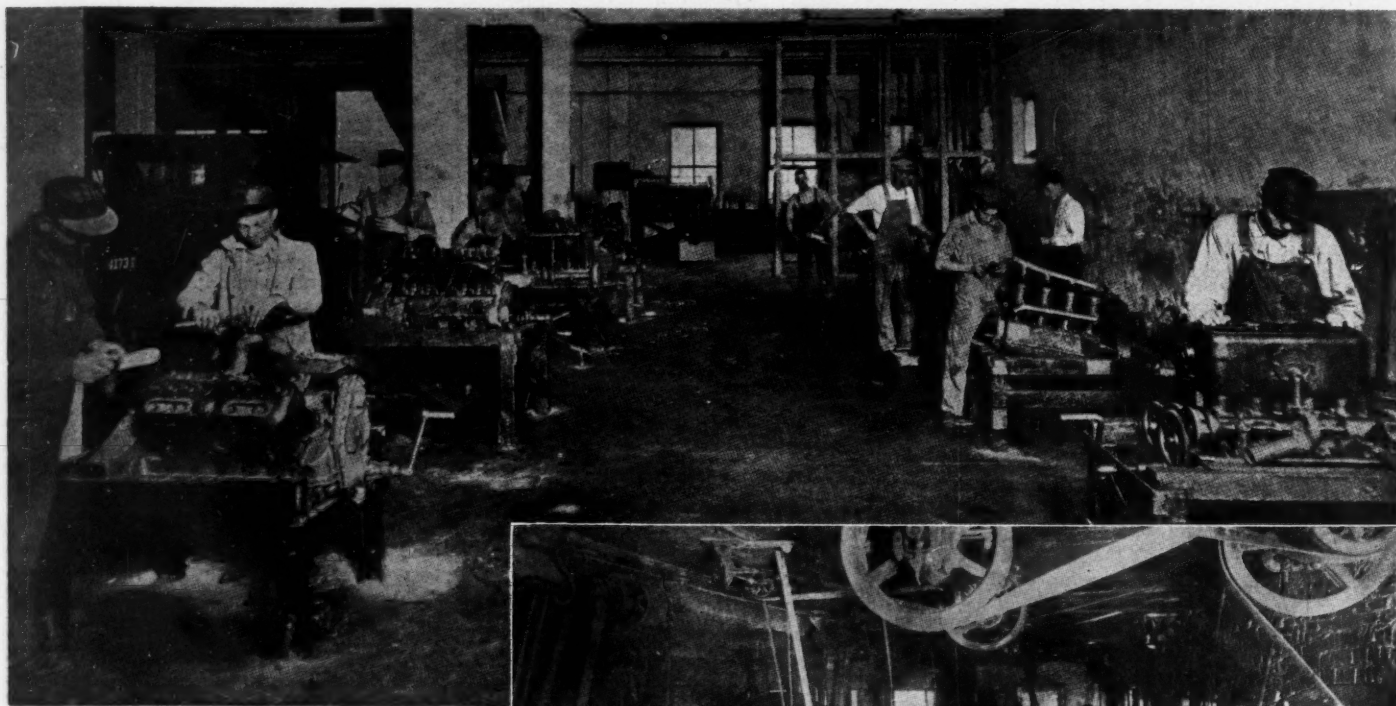
I saw a lecture room in which were probably fifty students in a class. The lecturer stood on a platform before the class and behind a long counter on which were to be found every used type of magneto and kindred electrical devices. He lectured, not from diagrams on a blackboard, but with an electrical instrument or a part of an instrument in his hand. This gives the student a chance for direct thinking and therefore greater concentration on what the lecturer is saying. Were the device to be pictured on the blackboard he would be obliged to picture mentally what the real device looked like and at the same time listen to the lecture as applied to the picture. This would scatter his thoughts and he would learn less. That is the theory in teaching the student everything possible directly from the device itself, whether it be a distributor or a complete car.

Lastly he carries all the knowledge he has already gained into the repair shop, and here he has indeed the opportunity to prove his mettle and what he has really learned. He finds a score and more of cars of all types and ages and in every condi-

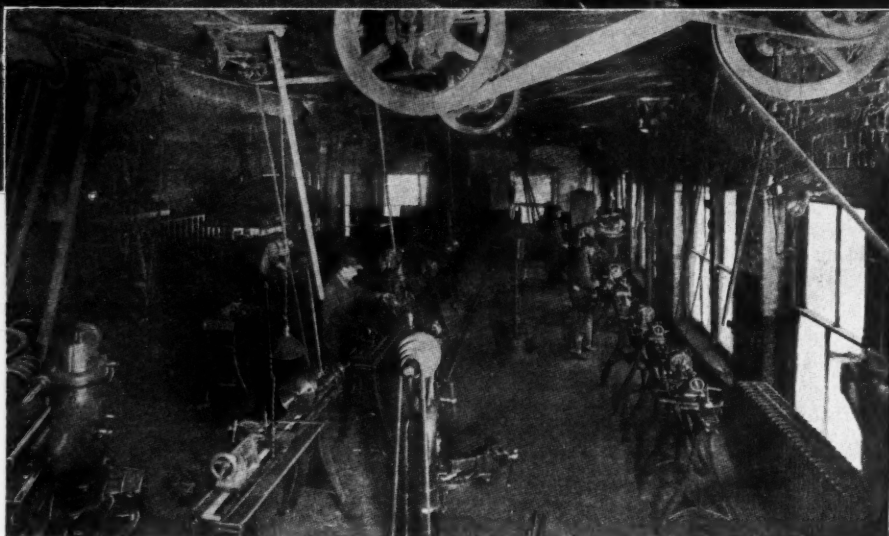
tion of assembly and disassembly—mostly disassembly. The students that graduate from this department vie with each other to see who can dismantle a car most completely and twist its "in'ards" about in the most puzzling way. The incomers step into this maze of wreckage with the duty of putting these cars back together again so that they will operate—properly—under their own power. When I walked through the department I counted four students scratching their heads, and I didn't blame them—even if their hands were greasy. It is some job, and the students that make those cars



A total of \$750,000 will be expended before this ten-story motor car school is ready for occupancy



Above—The gasoline engine room of the Sweeney school. Here the students learn the vitals of every commonly used type of engine. Note the modern eight-cylinder engine in the foreground. Right—A corner of the machine shops showing the battery of lathes of different sizes and types. Each student does his turn of practical work



run deserve a diploma and a medal besides for dogged persistence and patience.

As to the equipment, it is already thoroughly up-to-date, and more than that most of it will be entirely new in the new buildings. Engines and complete motor cars are found from white-whiskered old veterans up to—well, there is a new Cadillac eight, a new Packard twin-six, a new Willys-Knight engine, etc., etc.

Sweeney has built up his school to a state of modern, thorough perfection. Now he is going after the welfare of the students. He is going to house them in his own buildings where he knows their living conditions are as he thinks they should be. He is going to give them no reason for complaint about their lives in the school or out of it. And Sweeney's office door is always open to any of his boys who has questions to ask.

Another thing about Sweeney. Something you do not find in all educators. He admits that he is in the business for money and that he is making a bunch of money out of it. But he adds the amendment that his source of income would cease if he did not give dollar for dollar—and he has been teaching for 8 years, has moved into five new buildings, each time about doubling the capacity, and is now about ready to

move again into one of the finest buildings in Kansas City. Three-quarters of a million for a technical school covering only one branch of the technical field. It answers the question, "can a motor car repairman best be trained by apprenticeship or by teaching?"

PRODUCTION AT FORD PLANT

Detroit, March 9—The Ford Motor Co. factory here is making 3000 cars daily. They are assembled every 24 hrs. in the company's twenty-eight assembling plants throughout the country. A force of 1150 men is kept to make inspections. A new plan has been devised for inspection of piston rings which must show a tension of 13 lb. before the inspector can pass them. Formerly the rings were placed in special constructed scales to determine the tension. Since this plan was found too slow, a chute slightly wedge-shaped has been constructed in such a way that as the rings pass through they cause a small electric lamp to flash if the tension is 13 lb. If the tension does not attain this figure, the light fails to respond and the defective ring is thrown out. More than 75,000 rings are inspected thus every 24 hrs.

The company is using 40,000 gal. of oil each day, of which 30,000 gal. is fuel oil,

and 5000 gal. lubricating oil, motor oil, gasoline and kerosene. One hundred and fifty men are employed in the plant as oilers.

10,000 BETHELEHEM 1917 TRUCKS

New York, March 10—Ten thousand trucks of 1¼- and 2¼-ton capacity are planned for 1917 by the Bethlehem Motors Corp. in its new plant at Scranton, Pa. This plant is rapidly nearing completion and covers, with its three-story office building and power house, 130,000 sq. ft. The production building is 800 ft. long, the entire property occupying 20 acres of flat land on the main line of the Central Railroad of New Jersey.

COMPLIES WITH ORDER

Detroit, March 8—The Continental Motor Corp. has informed the Michigan Securities Commission that it will comply with the order to declare no more than 6 per cent dividends a year until it has reduced its intangible assets from \$10,265,000 to \$5,000,000. The company will make an appraisal of its plants, which it believes will display assets amounting to \$3,500,000 in excess of the present book assets and will then ask the commission for a rehearing.

A Step Toward Uniformity

Kansas City Patterns Its Traffic Regulations Essentially to Conform with the Eno System

KANSAS CITY has a set of traffic regulations which are being well enforced by the police and are very materially alleviating congestion downtown. These rules are not all that might be wished, but they are a conspicuous start in the right direction. And that Kansas City has this much is due, largely, to the campaign of MOTOR AGE for standardizing traffic rules. Indeed, J. A. Harzfeld, city counselor, and Edwin Camaek, chairman of the legislative committee of the Automobile Club, talked standardization ideas as much as local safety—and both kept the pages from the issue of Sept. 28 on their desks while the ordinance was being prepared.

A. J. Watson, president of the Federation to Protect Life and Property, also uses this issue to indicate what Kansas City must do to keep up with the procession, to avoid being in a class by itself without proper traffic regulations.

The campaign of MOTOR AGE came at a time when the promoters of traffic rules

were badly discouraged. For several months the Federation and members of the National Safety Council had been trying to make headway, using as a text, the pamphlet of Mr. Eno's street traffic regulations, issued by the National Safety Council. A frequent answer to the appeals for the adoption of such regulations was that they looked too complex and too difficult of enforcement. But MOTOR AGE showing that other cities had adopted features of the Eno plan and that many of the ideas were essential as well as feasible, helped to a change of sentiment. So positive was this change that despite the fears of the city counselor, there was comparatively little opposition to the adoption of the ordinance. This opposition was important, though small; it was overcome at the last moment by the united action of the Automobile Club, Federation to Protect Life and Property and the local Safety Council, together with other organizations.

While Kansas City aimed at the Eno

system, it fell short in several important particulars. For example, it eliminated parking on east and west streets downtown but allowed ranking on north and south streets at intervals of 4 ft., excepting near hydrants, large building entrances and transfer corners. These provisions have eliminated much of the congestion, however. Another feature that has not been worked out satisfactorily has to do with safety zones. The ordinance allows motor cars to pass safety zones. But there is some doubt as to whether these are really zones at night, for moveable standards are used to mark the limits of the zones, in addition to painted lines. The standards are removed from the streets at night and as there are no crossing patrolmen on the streets at night there, it is now a question whether the motorists must stop at night behind street cars, standing to receive or discharge passengers, in the downtown districts, as they do day and night in the outlying districts.

"The service of MOTOR AGE in the standardization of traffic rules has certainly been helpful to me and Kansas City," said J. A. Harzfeld, city counselor. "I have studied its suggestions very carefully and have used as many as possible at this time."

Edwin Camaek, chairman of the legislative committee of the Automobile Club, is equally appreciative, mentioning, also, the fact that MOTOR AGE's campaign assisted materially in stimulating the members of the club to the necessity of their working to secure proper traffic rules. Mr. Camaek is continuing the service to the community in obtaining interpretations of the rules as well as in the encouraging of their enforcement.

Direction Signal Criticised

Reader Takes Exception to Device That Is Useful Only to Motorist

LOUISVILLE, Ky., Editor MOTOR AGE—I have been reading with a great deal of interest the recent comment in MOTOR AGE on the subject of direction signals for motor cars and especially the articles signed Edwin H. Roberts, and as there is nothing like discussion to enable anyone to get at the actual facts, I am taking the liberty of criticizing certain of the statements made by that gentleman.

Mr. Roberts admits that the traffic signal is a coming necessity and that the installation of signals on closed cars at least is only a matter of time and yet he makes the very broad statement that no front signal is required "as a slight movement of the hand suffices." Strange to say, he follows this statement with the assertion that frequently when intending to make a turn, drivers hold out the right or left hand, as the case may be, and then turn the other way; the statement that a signal of this kind is given for the information and guidance of a driver following in the rear will certainly not go with the man on the street, who knows that for his direct benefit such a signal is almost universally given.

Then again, can anyone imagine a slight movement of the hand on the part of a person in a closed car, conveying any

information to the driver of a car following in the rear?

Of course, with a system of signals controlled by several push buttons or lever positions, a mistake is possible, especially if such a system is being operated by a driver who is in the habit of throwing out his left hand when he intends to turn to the right. In this connection the writer would suggest that no cross-eyed person be permitted to act as chauffeur.

If Mr. Roberts is right in his assertion that traffic signals are for the protection of one motorist against another and then only when traveling in the same direction, there is nothing further to be said, but to the man on the street, who frequently holds his life in his hands when he attempts a crossing, such a statement necessarily suggests a "road hog" who fails to recognize the fact that his poorer brethren, whose circumstances compel them to walk, have rights that even motorists are supposed to respect.

We agree that a traffic signal has to come, but while Mr. Roberts wants it for the protection of the motorist under one special condition, the writer wants it for the protection of a long suffering public, under traffic conditions generally.—Max Cer. J.

ST. LOUIS TRAFFIC RESTRICTED

St. Louis, Mo., March 12—Two additional traffic regulations have become effective in the congested district recently through action of the board of aldermen, who followed the advice of the police traffic squad.

One prohibits the turning of a car on any street in the congested district. Drivers who wish to reverse directions must go around a block. The second gives police power to signs set on curbs "do not park cars between these signs." Heretofore these signs depended on the courtesy of drivers. Such signs placed by occupants of property will not stand. In case too many of them are posted, the police have power to remove or alter the free spaces so designated. A third new regulation extends the 1-hour parking limit to additional streets.

Rewinding Electrical Machines

Instructions for Altering Starting Motor or Charging Generator to Be Used as a Motor on Different Voltage from Rated Value

By David Penn Moreton

GENERAL instructions for rewinding a direct-current motor or generator so that the machine will operate satisfactorily as a motor on a circuit whose voltage is different from that for which the machine was originally designed involve certain fundamental facts and relations, and after these facts and relations are thoroughly understood the necessary changes are quite easily made. For convenience, let us assume that we have a series-wound starting motor which is rated at 6 volts and we wish to change the armature and field windings so that the machine will operate as a shunt motor on a 32-volt system.

The very first thing that we must do is to determine the value of the voltage generated in the armature when it is revolved at a certain constant speed for different values of current in the field winding.

The connections for making this test are shown diagrammatically in Fig. 1. A voltmeter V of suitable range should be connected to the brushes of the machine. A variable resistance R and ammeter A should be connected in series with the field winding and the combination in turn connected to a battery B.

Before starting the test make sure the brushes are in their proper position which may be determined by moving them backward and forward around the commutator until the position which gives a maximum voltage for a certain speed and field current is found. Now keep the speed of the armature constant, say at 4000 r.p.m. and gradually increase the field current by decreasing the resistance R in series with the field winding and battery.

Allow the field current to become steady at certain values, say 25, 50, 75, etc., amperes and for each of these values of field current determine the value of the voltage as indicated by the voltmeter. Let us assume that the value of the voltage generated for different field currents corresponds to the values given in the following table when the speed is 4000 r.p.m.

CURRENT AMPERES	PRESSURE VOLTS
0.....	0.30
25.....	1.06
50.....	2.02
75.....	3.06
100.....	4.16
125.....	4.87
150.....	5.25
200.....	5.64
250.....	5.86
300.....	5.98
350.....	6.04

This observed relation between current in the field winding and the value of the generated voltage may be represented

graphically as shown in Fig. 2. Current is laid off to a suitable scale on the horizontal line and voltage to a suitable scale on the vertical line. The line marked 4000 r.p.m. will be what is called the magnetization curve of the machine for a speed of 4000 r.p.m. The magnetization curve at any other speed may be readily determined from this one by increasing or decreasing the height of the curve in proportion to the increase or decrease in speed, since the voltage generated varies directly as the speed.

For example, the height of the 6000-r.p.m. magnetization curve will be one and one-half times the height of the 4000-r.p.m. curve; likewise, the height of the 2000-r.p.m. curve will be just one-half the height of the 4000-r.p.m. curve, etc.

It will be observed that the three curves shown in Fig. 2 have quite a pronounced curvature in them at a point corresponding to a current of approximately 125 amp. This point in the magnetization curve is called the "knee" of the curve. Now in the operation of the machine it is desirable to have the magnetic circuit magnetized to such an extent that the magnetic circuit is being worked above the knee of the magnetization curve.

Now assume this machine is to be changed to a shunt motor for 32 volts. In this case, the field winding will be in parallel with the armature and the voltage applied to the field winding will be 32 volts. It is apparent that if 32 volts be connected to the low-resistance field winding now on the machine that a very high value of current will be produced and the winding will more than likely be seriously damaged and at the same time an excessive current will be drawn from the source of energy. Both of these difficulties can be overcome by rewinding the field which may be done as follows:

Carefully remove the field windings from the poles and in doing so count the exact number of turns around each pole and at the same time observe the manner in which these coils are wound around the poles and connected together in order to produce the proper polarity. The product of the number of turns in each coil and the current in the coil in amperes at any time gives what is called the ampere turns.

If all of the field coils are connected in series, then they will carry the same current and it will be equal to that indicated

on the ammeter A in Fig. 1. In some cases the field coils may be connected in parallel and in such a case the current in each coil will be equal to the total current divided by the number of circuits or paths into which field coils are grouped. Let us assume in this particular case that there are eight turns in each coil and they are all in series, then for a current of 175 amp. there will be 7×175 or 1400 amp. turns per pole. This number of ampere turns is to be produced by a pressure of 32 volts applied to the new winding. That is, the resistance of the new field windings, all in series, should be such that the current produced by 32 volts multiplied by the number of turns in each coil will give a value of 1400 ampere turns. Now if there are four field coils in series the voltage applied to each coil will be equal to one-fourth of the total, or 8 volts. Assuming for the time being a field current of I_s amp. then the resistance r of each field coil will be equal to $(8 \div I_s)$ ohms, or

$$r = \frac{8}{I_s}$$

Also assume that there are N turns in each coil and that the average length of each turn is L feet. This length will have to be approximated by measuring around the pole core out a distance equal to what you think will be one-half the depth of the new coil or winding. Now the resistance of the coil may be expressed as follows:

$$r = \frac{K \times N \times L}{A}$$

In this last equation A is the area of the wire to be used in circular mils and K is a constant depending upon the kind of material. For copper the value of this constant K may be taken as 12 for ordinary operating conditions.

There are two values of the resistance r given above and they may be placed equal to each, which gives the following equation:

$$\begin{aligned} 8 &= K \times N \times L \\ \frac{8}{I_s} &= \frac{K \times N \times L}{A} \\ \text{or} \quad 8A &= K \times N \times I_s \times L \\ \text{then} \quad A &= \frac{K \times N \times I_s \times L}{8} \end{aligned}$$

The product of N and I_s in this last equation represents the value of the required ampere turns, which is 1400 for this particular case. Let us assume that

the length of one turn in this particular case is 15 in. or 1¼ ft. then the value of A may be determined by substituting the values of the various quantities in the last equation which gives,

$$A = \frac{12 \times 1400 \times 1\frac{1}{4}}{8} = \frac{21000}{8} = 2625 \text{ circular mils.}$$

Looking up in the wire table we find that a No. 16 B & S gage copper wire has an area of 2583 circular so we will use a No. 16 wire.

A No. 16 wire will safely carry 4 amp. so with this current and 1400 amp. turns required, the number of turns in each coil will be equal to $1400 \div 4$ or 350. The length of 350 turns will be equal to $350 \times 1\frac{1}{4}$ or 437.5 ft. and the resistance of this length will be given by the following equation:

$$r = \frac{12 \times 437.5}{\frac{2583}{8}} = 2.03 \text{ ohms}$$

$$\text{Then } I_s = \frac{2.03}{8} = 3.94 \text{ amp.}$$

$$\text{and } NI_s = 3.94 \times 250 = 1382 \text{ amp. turns.}$$

If it is impossible to get 350 turns of No. 16 wire in each coil you may have to raise the current density and use a smaller number of turns but it is not advisable to run the current density too high as the coils are likely to heat unduly.

The general procedure in rewinding the armature may be taken care of as follows: There is a voltage generated in the armature of any motor when the armature revolves in the magnetic field and the direction of this voltage is exactly opposite to the voltage applied to the brushes and for this reason it is called the counter-electromotive force. The difference between the impressed voltage and the counter-electromotive force gives the value of the net voltage which produces the current in the armature circuit. The value of the armature current at any instant then is

equal to the net voltage at that instant, divided by the resistance of the armature.

The voltage generated in the armature winding before any changes are made will, in this assumed case, be 5.5 volts for 1400 amp. turns and a speed of 4000 r.p.m. The difference between 32.0 and 5.5 volts gives too large a value for the net voltage so the counter electromotive force will have to be increased by either allowing the speed to increase, which it must do with the present winding, or rewinding the armature with more turns.

Measure the resistance of the armature between brushes. This may be done as follows: Lock the armature and send a known current through it. At the same time observe by means of a voltmeter the voltage between brushes. This voltage divided by the current gives the resistance of the armature. The resistance of the armature multiplied by the normal full-load current will give the voltage lost in the armature. This voltage subtracted from the impressed voltage will give the counter-electromotive force generated in the armature. For example, suppose the resistance of the armature is .01 ohm and the

motor is taking a current of 200 amp. from a 6-volt battery. The voltage lost in the armature will be equal to $200 \times .01$ or 2 volts, and if the impressed voltage is 6 volts the counter-electromotive force will be equal to $6 - 2$ or 4 volts. The speed of the motor under these conditions may be determined by locating the point A in Fig. 2, which corresponds to 200 amp. and 4 volts. This point A is on the magnetization curve for some speed between 2000 and 4000 r.p.m. and a portion of this curve is shown dotted. The height of the point A is to the height of the point B as the speed the dotted curve corresponds to is to 4000. The value of the speed of the dotted curve is

$$\frac{4}{5.64} \text{ of } 4000 = 2840 \text{ r.p.m. approximately.}$$

With an impressed voltage of 32 volts the counter-electromotive force will be approximately five times what it is with 6 volts. If the speeds are to be approximately the same in the two cases, the number of turns of wire on the armature will have to be increased to be five times their original value. A smaller wire will have to be used, approximately ½ the size originally on the armature. If the number of turns on the armature be increased to five times their original number and the wire reduced to one-fifth its original size, the resistance of the armature will be increased to twenty-five times its original value.

The armature winding should be carefully removed from the armature core and the exact number of turns in each element observed as well as the manner in which they are connected. Then rewind the armature with wire of such a size that approximately five times as many turns may be put on as you took off.

There are a number of conditions which have not been mentioned that will influence the operation of the machine, but space will not permit a more detailed discussion. Don't be surprised if you get considerable sparking at the commutator with the new winding.

GORDON TO INCREASE CAPITAL

Canton, Ohio, March 9—To take care of factory expansion, the Gordon Rubber Co. will increase its capital \$1,000,000. The present capital is \$600,000. The issue will consist of \$500,000 preferred and \$500,000 common.

N. A. C. C. OFFERS AID

New York, March 10—The National Automobile Chamber of Commerce, which includes 101 motor car makers, has placed its resources at the call of President Wilson for any emergency. A message to that effect was sent to the president and the secretaries of war and navy from a meeting in New York. The factories included in the chamber have a capacity of more than 1,000,000 motor vehicles a year.

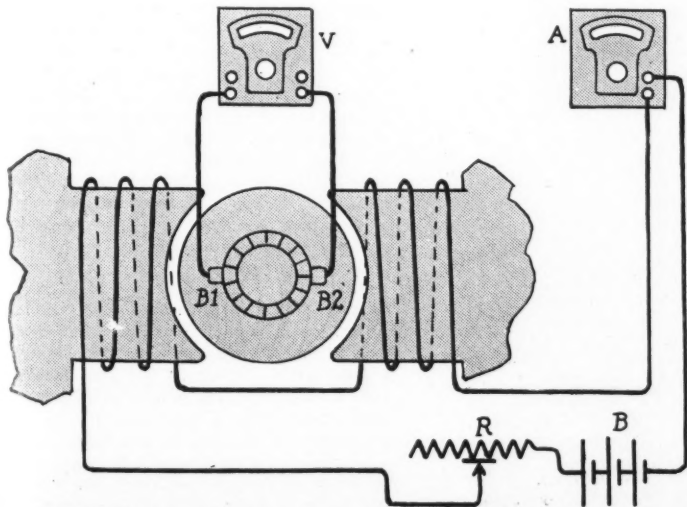


Fig. 1—Connections for determining relation between value of voltage generated and current in the field winding

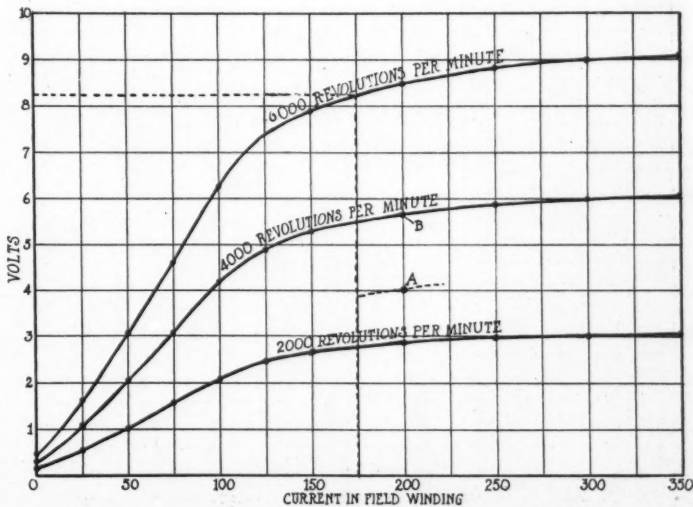
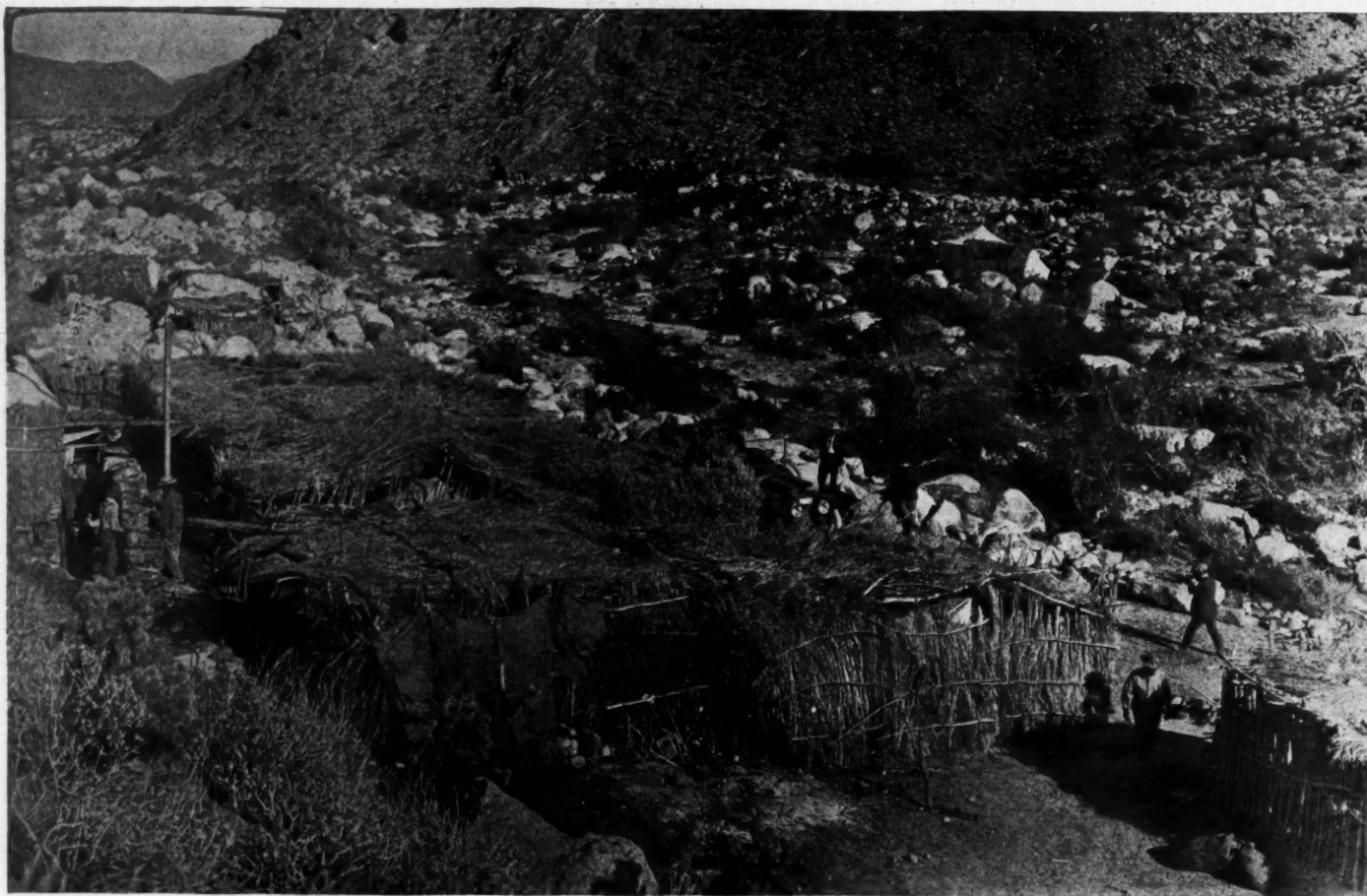


Fig. 2—Here the observed relation is represented graphically in magnetization curves representing three speeds

Mexico as a Road Builder



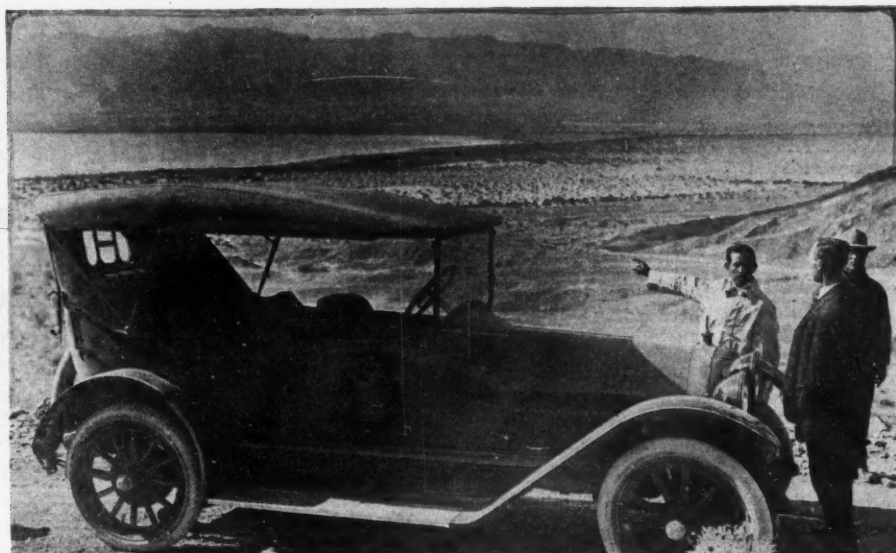
Lower California calls to mind bandits more readily than it does motor cars and good roads, but the future holds in store a far different reputation since Cantu, formerly colonel in the Mexican army and now governor of this isolated Mexico, has begun a state highway that is to do wonders to the region. The headquarters of the Mexican engineers in charge of the construction are in Canon de Llanos, where the bandits were exterminated less than a year ago. Reed houses are fitted with modern comforts. There is no fear of rain as the annual precipitation is less than an inch



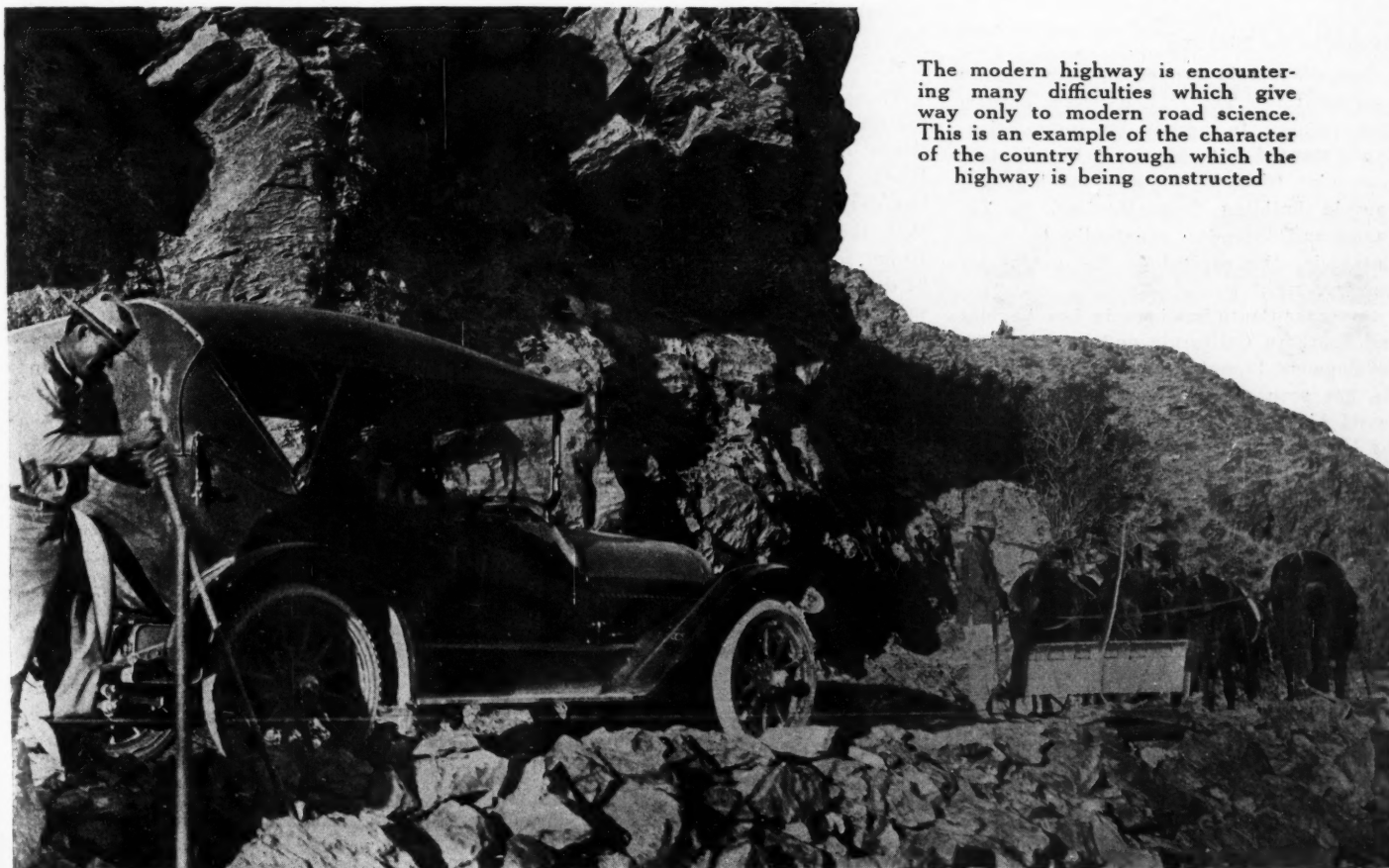
Two Mexican engineers are shown, the men to the left. One is pointing out the highest point Cantu's highway will reach, 4,200 ft. Cantu has been governor three years. He had been trained for warfare only, but the separation from the warring factions gave him leisure to study transportation conditions. The state highway is to be 128 miles long, 24 ft. wide and of macadam and concrete. Lateral roads will open the entire territory to travel and transportation of the crops increased cultivation has brought. The cost of the highway is estimated at \$750,000, and it is to be finished in June. As the road work progresses the horse and mule transportation in Cantu's service is replaced, wherever practicable, by motor cars and trucks. Dozens of cars and trucks have been bought during the last year for public service in Lower California. Young Mexicans who had no knowledge of the mechanism of a car or truck now are employed as drivers and even as mechanics. This spring, government garages are to be built in several Mexican towns for both public and private repair work. The repair work now is done on the American side



Captain L. Jeymes is in charge of transportation for Cantu. Transportation throughout the peninsula has been, and in a large measure continues to be, confined to horse and mule wagons and burros. In some of the more isolated sections, inhabited by Indians, the carreta, a two-wheel vehicle with wheels of solid wood, is still in use for transporting crops, as well as members of the family. However, all this is changing, and the completion of the state highway and its auxiliaries is to change it more



Laguna Salado, Salt Lake, lies in the distance. It is 65 miles long and averages 12 miles in width. The water is similar to that of the Great Salt Lake of Utah. Cantu's highway passes by it. Esenedas, the capital of Lower California, is on the Pacific Coast of the peninsula, and more than 100 miles away from the more thickly populated sections along the border. The way to it leads over rocky trails, mails are slow and the telegraph is the principal means of keeping in touch with the outer world or Mexico City. But Cantu did not like this seclusion. Times were troublesome, and he moved his capital to Mexicala, which is on the border at the foot of the famous Imperial valley. The trails of that region have become wide, well-drained natural roads that reach to the plantations and make it easier to transport crops and supplies. Roads connect the border towns on the Mexican side and offer the shortest practical route to Ensenadas



The modern highway is encountering many difficulties which give way only to modern road science. This is an example of the character of the country through which the highway is being constructed

A MEXICO AT PEACE

Lower California Is Building a State Highway Instead of Quarreling

"DYNAMITE—that's what I want. If they'd only let me have enough of it, I'd have this road completed by next May. I'm going to get it, though, one way or another. I've got the money to pay for it and that usually gets anything."

And with a slight shrug of his shoulders and an elevation of his eyebrows, Estabano Cantu, military governor of Lower California, indicated to his chiefs of staff, engineers and other officers assembled with him about the banquet board at Mexicali that he knew whereof he spoke. His subalterns were positive of it and the gringo visitors from Los Angeles, who heard him say it, mindful of dire things that have happened in the past and always fearful of borderland possibilities, were discreetly silent.

This was no declaration of war on the part of Governor Cantu, though. It must be noticed that he was speaking of finishing a road, and this is the story. With every other section of Mexico teeming in turmoil, Baja, Lower California, is in a state of peace with itself and the rest of the world. Why is this? The answer is Estabano Cantu, appointed military governor of Lower California by one of Mexico's numerous presidents.

Dynamite for Blasting

But about this dynamite. Cantu really does want it. The United States authorities refused to permit its importation. Cantu wanted it to blast out the sides of mountains to open the way for his road now in building from Mexicali to Tia Juana and intended eventually to reach Ensanada, the capital of his peninsular country.

Governor Cantu has been in Los Angeles and Southern California and has seen the development brought about by good roads. He has seen thrown open to public use paved highways on the northern side of the border that become sand stretches full of chuckholes after the line of sentries has been passed. On the California side of the Imperial Valley region he has seen what water systems have done for crops and how these crops have been taken over concrete roads. These developments have been an inspiration. He realizes they would mean the same thing in Lower California, so he is seeking to bring them about. Motor cars are not uncommon in Mexicali, directly across the line south from Calexico, the two towns whose names are formed through the combination of the words California and Mexico, the first syllable determining the location in relation to the boundary. The governor makes his

New Military Governor Wants Good Roads System

home in Mexicali and he desires to see that city as well provided for municipally as Calexico.

The United States would not send dynamite to Cantu, but he sent cotton to the United States. And cotton was greatly in demand. On every pound that crossed the border, Cantu levied a tax. This, in a measure, accounts for the fact that some time ago when he purchased an American-made motor car he paid for it in gold coin shaken from an old leather poke. He always seems plentifully supplied with money, one of the virtues of peace.

When *el gobernador* decreed he would have a modern road 24 ft. wide, built of macadam and concrete, extending 128 miles from Mexicali to Ensanada, linking all the border towns on his side of the line, his people knew he would have it. Had they not seen him build a \$40,000 school building when there were no children to put in it? They said *manana* it would be filled. He sent out his engineers and after Senor Aldunzin and his assistant Gonzalo Garito had reported on its feasibility, he asked not, "How much will it cost?" but merely told them to go ahead.

Though the highway rises from below sea level in the Imperial country to an altitude of 4200 ft., where it crosses the Black Butte mountains, Senor Aldunzin has drawn his plans and specifications so that there shall be no grade to exceed 10 per cent nor any curvature of less than 24 deg. The governor's engineers are, the same as he, graduates of Chapultepec, the Mexican training school that occupies the same relative position to the Mexican army as West Point to that of the United States. Though Aldunzin and his assistants are officers of the army, they have departed from military service, along with Jose Cantu, brother of the governor, to devote all their energies to road work and kindred enterprises.

It is proposed to make the new highway the main artery of travel in northern Lower California. The proposition embodies the later construction of several links. When completed, it not only will provide a commercial outlet but a strong military asset for moving troops and supplies. The thousands of acres of cotton land will become immensely valuable. Picking the staple furnished an income for thousands of laborers, most of whom are Chinese, and the crop was not all garnered until late in

February. The laborers in the fields and those on the road are paid in American money. There is no peonage under Cantu, and he seems to have an abundance of gold always at his command for any purpose.

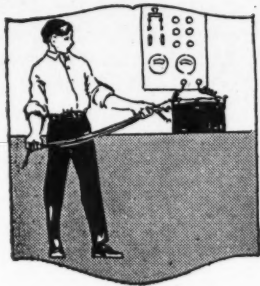
Scenic attractions that will induce hundreds of motorists from the United States to travel over the new highway are many and varied. About 20 miles from Mexicali and only a few miles from the road is the famous Laguna Salado, Salt Lake, which is about 65 miles long and varying in width from 5 to 12 miles. It is similar to the Great Salt Lake in Utah inasmuch as it has no visible outlet, but the salt saturation is less. This region is a paradise for the hunter of wild fowl. Wild geese and ducks obscure the light of the moon frequently when making migratory flights, it is told, so dense do the flocks travel; and to fill the tonneau of a motor car with these birds is a matter of only a few hours' effort. Skilled marksmanship is not an essential to a full game bag.

There are hot springs near the lake, and some day Cantu may realize another source of income by opening a resort here. The shifting sand dunes with their element of weird mystery always are changing. The Black Butte mountains were the home of bands of marauders until Cantu got on the job. He has practically killed all of them, and he has offered no alternatives.

Camps Are of Huts

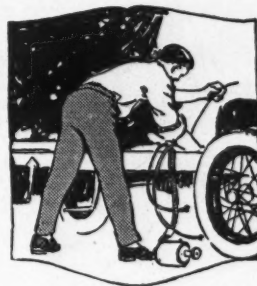
The road construction camps are made up of clusters of thatched huts and tents. There is an effort toward sanitation, and though from 300 to 600 men have been at work for many months, there has been no disease to contend against. The sites for the camps always are well selected. The thatch serves to keep out the blistering heat of the sun and is ample protection against rain. The disease-carrying proclivities of the rat are recognized, and a careful watch is kept against rodents. In the huts are some of the luxuries of civilization. The Mexican loves music and in addition to the usual hand instruments there are music boxes in assorted sizes and values.

Supplies and materials for the road work have been hauled on wagons, but Cantu is a thorough progressive. He has bought American made trucks. He is an ardent motorist. For his own use and that of his assistants he has three Packard twin-sixes, four Hudsons, two Vim trucks, a Haynes touring car and has ordered four additional Packards. There are small cars without number, and the hardest kinds of service is required of these.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the thirty-fifth installment of a weekly series of articles begun in MOTOR AGE issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently.

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems, and the relations of current pressure and resistance were brought out. This was followed by an explanation of series and multiple circuits, how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was considered. A section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and the best methods of charging them. Magnets and electromagnetism then were considered, and the principles of generators and motors were explained. A section on generator output was followed by one on the purpose and operation of the cutout. The section on Engine and Motor Connection began March 1 and was preceded by one on Electric Motors.

Part XXXV—Motor and Engine Connection—Bendix Drive

THE Bendix drive consists of a solid or hollow shaft having screw threads on the outside and a hollow gear having screw threads on the inside, so that the gear screws on the shaft like a nut on a bolt. A circular weight is fastened to the gear and is slightly out of balance. A coil spring connects the electric motor shaft and the hollow screw shaft. The relation of these various parts is shown in Fig. 204.

When the electric motor starts, it drives through the spring and turns the screw shaft. Because of the weight the gear is too heavy to turn with the screw shaft, and because the gear does not turn it must move along the screw shaft, just the same as if you turned a bolt having a nut on it and kept holding the nut with your fingers to keep it from turning so that it would be screwed along the bolt. After the screw gear has moved along the screw shaft and engages with the flywheel gear, it then keeps on moving along until it reaches the stop at the end of the screw shaft. The two gears then are fully meshed, and when the screw gear has reached the stop it must turn with the screw shaft. At this moment the screw shaft and electric

motor are revolving at a great speed, and this great blow and the power of the electric motor both are taken through the coil spring. The spring keeps coiling until all this power has been applied to the flywheel gear and the engine starts turning.

As soon as the engine starts exploding and runs under its own power, the flywheel turns much faster than when it was cranked by the starter. Because it is now turning so much faster it increases the speed of the screw gear, so that the latter runs faster than the screw shaft on which it is mounted. Therefore, when the screw gear runs faster than the screw shaft, it is screwed on the threads of the shaft, like a nut on a bolt, until it has been screwed out of mesh with the flywheel gear. This de-meshing movement is entirely automatic and eliminates the use of an over-running clutch. Now that the screw gear is out of mesh, it is natural to suppose that if the electric motor keeps running, the gear automatically will be screwed right back into mesh with the flywheel gear. But the unbalanced weight on the screw gear now performs its automatic function, that is, being slightly out of balance, the weight twists

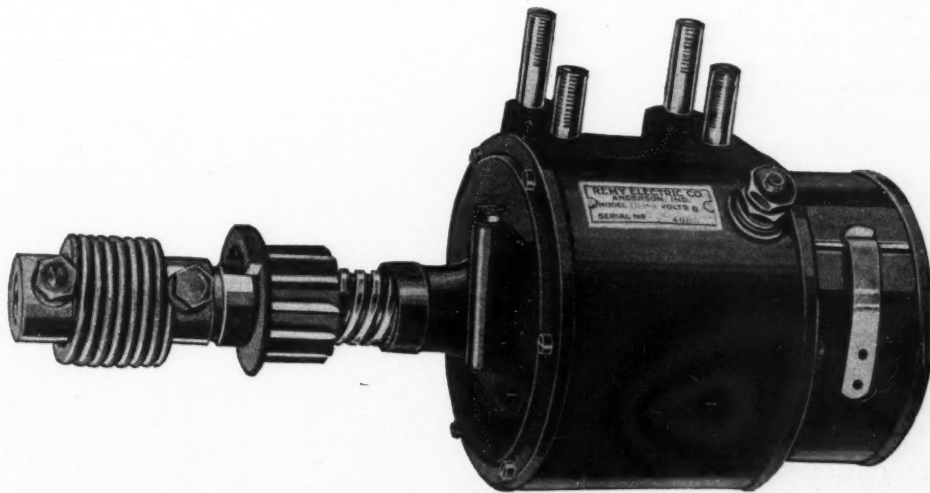


Fig. 204—Bendix drive, or automatic pinion shift, showing the relation of the various parts as applied to Remy motor

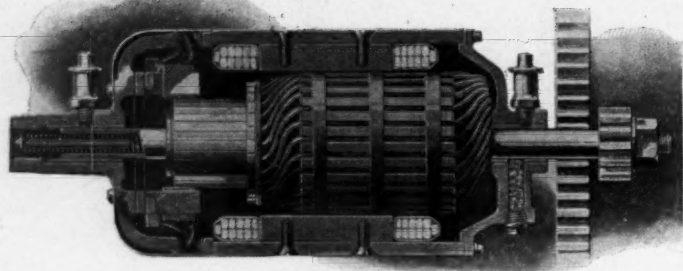


Fig. 205—Sectional view of old Bosch-Rushmore starter. It is still a feature of Bosch products but has been improved decidedly

or cocks the screw gear so that it clutches and binds on the screw shaft and turns with it. This automatic clutching is due to the centrifugal force of the unbalanced weight. When the electric motor stops running the screw gear has been fully screwed away from the flywheel gear, and it remains in that retarded position until it is required to start the engine.

The gear on the screw shaft has an automatic self-cleaning action, but, in any extreme case, should the gear tend to stick on the shaft, through being covered with mud, it may be necessary to clean the screw.

The teeth on the screw gear and flywheel are chamfered, or pointed, on only one side to make the meshing natural and easy. However, should the teeth meet, end to end, the screw shaft itself is designed to move backward automatically and compress the coil spring. This gives the screw gear time enough to turn and enter the flywheel gear. Should sticking of gears ever occur, they can be released by throwing in the clutch and moving the car. Such trouble would be due to incorrect chamfering or inaccurate alignment of the gears. Also it might be due to the binding of the drive parts and prevent compressing and proper functioning.

If, while the engine is running, the electric motor should be started accidentally, the screw gear will screw over against the turning flywheel gear. But instead of the clashing and smashing of gears that might be expected there is no danger whatever, as the gears simply touch once. This is because the flywheel gear will speed up the screw gear, and thus automatically screw it away. The turning screw gear will then automatically clutch and bind on the screw shaft, in exactly the same manner as when it is cranking and has been de-meshed when the engine starts exploding.

Old Bosch-Rushmore Electromagnetic Drive

The starter drive used on the old Rushmore system, which was acquired by the Bosch Magneto Co., and later known as the Bosch-Rushmore system, is a feature of the later Bosch products with decided improvements. The old Rushmore drive is illustrated and described herewith. The Bosch improvements will be taken up later.

The construction of the Bosch-Rushmore motor is such that the

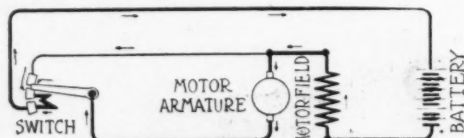


Fig. 206—Electrical circuit of Bosch system with switch pedal in first part of downward movement

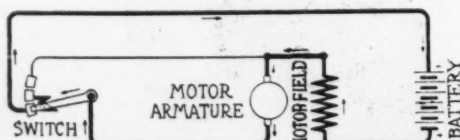


Fig. 207—Here the switch pedal has completed the downward movement and the engine turns over

armature can be shifted endwise in its bearings. In the non-operating position the armature is held out of its electrical center or, in other words, out of line with the pole shoes, by a spiral spring in the commutator end of the armature shaft; therefore, when in the normal position, the pinion on the driving shaft of the starting motor is out of mesh with the gear ring on the flywheel of the engine. A sectional view of the motor is shown in Fig. 205.

The motor is provided regularly with three terminals, two of which are heavier, or of larger diameter, than the other. The two heavier terminals are for the main circuit, and the single small terminal is for the shunt circuit.

During the first part of the downward movement of the switch pedal an electrical circuit is established, which causes the current from the battery to pass through the switch shunt. The amount of current that can flow is limited by the resistance of the circuit, but of the current which passes through the switch shunt a small portion is allowed to flow through the motor armature, while the greater portion flows through the motor field coils, forming thereof a strong electromagnet. See diagrams of electrical circuits as given in Figs. 206 and 207. The result is a powerful attraction between the field coils and the armature, causing the latter to be drawn endwise into the magnetic center of the motor or, in other words, into its working position between the pole shoes. The passing of the small current through the armature causes the armature to rotate slowly, and as the rotary motion occurs simultaneously with the shifting of the armature endwise, the meshing of the motor pinion with the gear ring on the engine flywheel is accomplished quickly and positively.

Operation More Rapid Than Explanation

As the switch pedal reaches its limit of motion the flow of battery current through the switch shunt, as well as that through the shunt cable to the field coils, is interrupted, and a straight series motor connection is established, allowing the entire current to pass through the motor field and armature windings and causing the engine to turn over until it starts firing. Although it takes time to explain this series of actions, the entire operation takes place so rapidly that the impression on the observer is that the motor pinion slips into place and begins turning the engine flywheel immediately after the starting switch pedal is depressed.

As soon as the engine starts the starting motor is relieved of its load, and the current passing through it drops rapidly in volume, this being a characteristic of series motors. In consequence, the strength of the field magnets is lessened to a point where the spiral spring in the end of the armature shaft overcomes the magnetic attraction holding the armature and returns it to the original, or non-operating, position. It is this action that automatically and positively throws the armature shaft pinion out of mesh with the flywheel gear ring. Thereafter, until the starting switch is released, any current which continues to pass through the armature merely will cause the latter to revolve freely but without meshing with the flywheel, due to the fact that the amount of current utilized when the motor is running free is not sufficient to overcome the tension of the spiral spring. The non-operating position of the armature is shown in Fig. 208 and the operating position in Fig. 209.

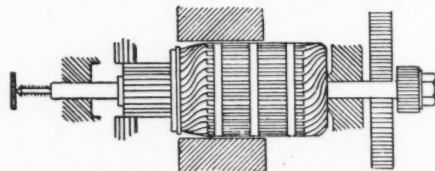


Fig. 208—Armature of Bosch starting motor in non-operating position

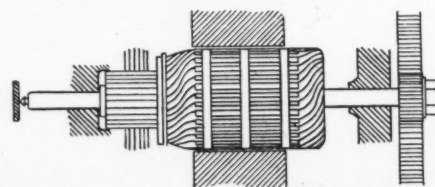


Fig. 209—Armature of Bosch starting motor in operating position

The combined motor and generator used in the system manufactured by the United States Light & Heating Co. differs from any of the other systems which are designed primarily for starting and lighting systems in that the device is incorporated in the flywheel housing, and the revolving part is mounted directly on the end of the engine crankshaft without any reduction gears or chains of any kind. The component parts of the system are shown in Fig. 210. A section through an assembled system is shown in Fig. 211, in which the parts shown in shaded areas are to be furnished by the U. S. L. company and parts shown in white, or section, are to be furnished by the manufacturer of the car. The field is of the multipolar construction and it is held rigidly in position by bolts in the front of the flywheel compartment. The armature, or rotor, is mounted on a special flange fastened to the back end of the engine crankshaft, and it revolves outside the field structure. In some types of U. S. L. systems the armature revolves inside the field

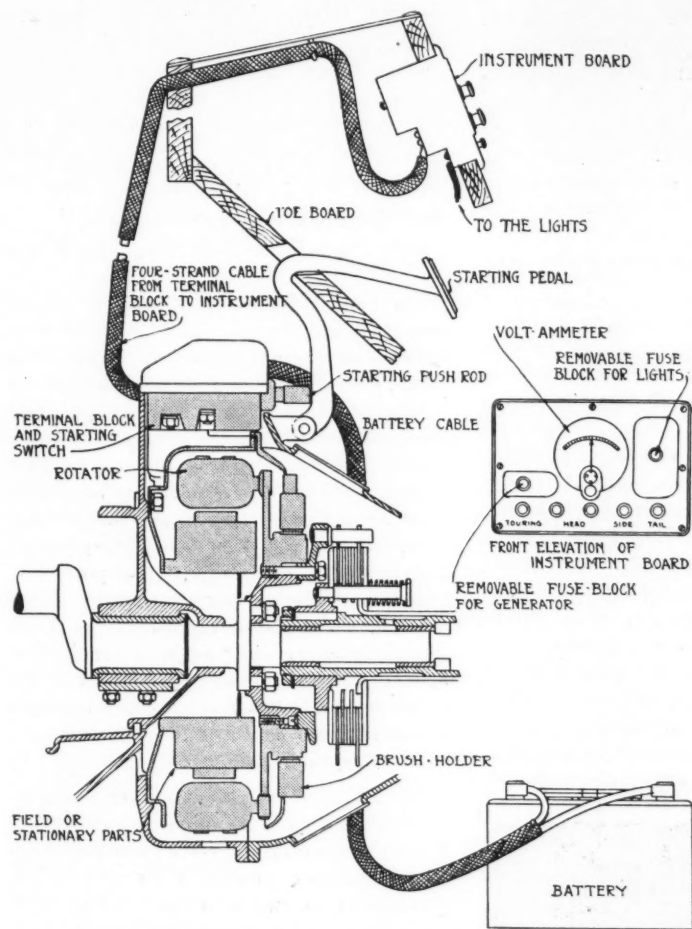


Fig. 211—Section through assembled U. S. L. system. The parts shown in white are furnished by the maker of the car; those in shaded areas, by the U. S. L. company

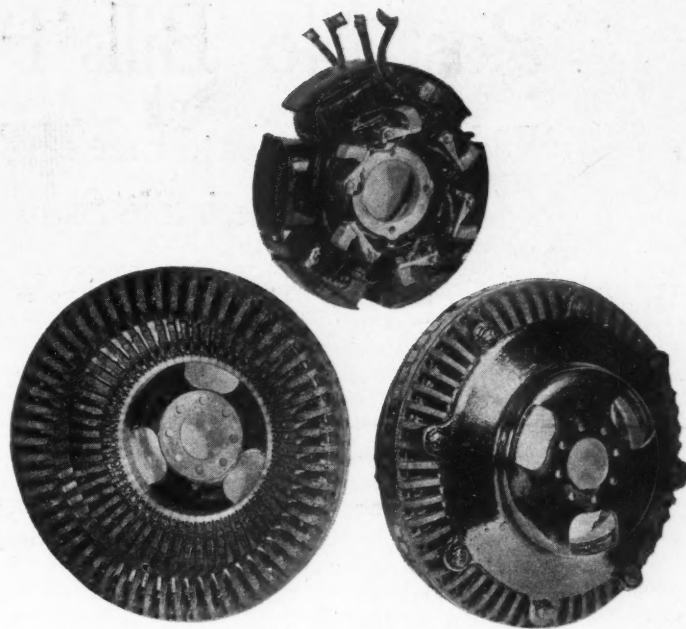


Fig. 210—Component parts of U. S. L. system. A combined motor and generator is used in this system

structure. The brushes are supported by a brush ring which is attached to the flywheel housing by suitable extensions. A complete description of the electrical operation of this system will be given in one of the following chapters.

Back-Kick Releases

The object of a back-kick release is to take care of any excessive strain which may be put on the device used in connecting the motor to the engine. If the spark lever be too far advanced, there will be a premature explosion, which will tend to rotate the motor in the opposite direction to that in which it is running and thus subject the connecting device to a very severe strain. The power of the motor is ample to overcome this strain in the majority of cases, and the connecting devices are designed with this abnormal condition in mind, and as a result the necessity of any special device is not nearly so great as it might at first appear.

A device used by the Northeast company consists of a friction clutch which is held in contact by springs. This clutch will not slip under ordinary and reasonable loads, but should the load become unusually excessive it will slip and thus protect the remainder of the connecting equipment between the motor and the generator.

A friction clutch is used on the Hartford starter on account of the irreversible worm-and-worm gear drive used, as the teeth of the gear would more than likely be damaged in case the engine back-fired.

A brake band is sometimes used in combination with the starting gears, and this band is held tight, in such a manner that it holds and transmits power in one direction only.

MORELAND PLANS NEW PLANT

Los Angeles, Cal., March 9—The Moreland Motor Truck Co., truck manufacturer, is planning the erection of a new plant at Alhambra to cost about \$200,000.

BODY BUILDERS TO RETIRE

New York, March 13—Special telegram—J. M. Quinby & Co., Newark, N. J., one of the oldest carriage and motor car body builders in the country, will retire from business after eighty years' activity. The \$400,000 factory in Newark is for sale. The company has built bodies since 1900, specializing on high class work, a large

part of which was for foreign chassis. Last year the company planned to manufacture a \$5,000 car with production of 500 yearly, but negotiations fell through. Plans for the future are undecided.

COLE COMPANY SUFFERS FIRE LOSS

Indianapolis, Ind., March 12—Fire in a temporary finishing room at the plant of the Cole Motor Car Co. caused a loss of \$15,000 Thursday night. Officials of the company announced that though a few car bodies had been damaged that the blaze would not affect the production of the plant in the least. The foreman of

the finishing room went to work while the fire was still burning to equip an experimental department that is not in use at this season of the year as a finishing department, and the full force of employees resumed work as usual the following morning.

RANIER DELIVERS DELIVERIES

New York, March 12—The Ranier Motor Corp., Flushing, N. Y., is now making deliveries of its delivery car. The factory was started less than six months ago. Deliveries are now averaging five machines daily.

"Post No Bills Here"

Federation Works to Free Highways from Undesirable Signs

WHILE the nation at large is demanding that the national parks be made more accessible to motorists, one national organization is devoting the time, efforts and means of an important branch of its body to getting national parks and, once having obtained them, to making the roads leading to the great playgrounds as beautiful for the motorists and the rest of the public as the parks are.

The United States gradually is getting permanent possession of the great scenic districts of the country, though there are those districts yet in no way under national control and, hence, subject to the vicissitudes of chance. But there are fewer at the mercy of chance today than there were yesterday, and it is the motorist and the motoring road that can claim part of the credit for them. The motorist clamors to get in the door shut between him and natural beauty. The motoring road must lead to something worth while, and its beauty enroute should match its end. This organization in mind is helping both to open the door and to insure beauty enroute.

Woman Who Leads Work

The other day I was talking to the head of the branch of the organization that is doing so much to make national parks and, having made them, to make them accessible by beautiful highways. She was in a hospital here in Chicago, suffering from an injury received while in the Panama Canal Zone some time ago in the interest

of the same organization. With one arm held at right angles to her body by a plaster cast she was writing on a small typewriter with the hand of the other arm. She had not dropped her work, and her work is of special interest to motorists.

The conservation department of the General Federation of Women's Clubs has played an influential part in the arousing of the wave of interest in national parks and good roads among American women. The department has a chairman who devotes her entire time to the work and who speaks in the interest of the department in various states in the Union during the course of the year. It was the chairman who told me of the federation's new campaign.

Mrs. John Dickenson Sherman has been interested in the preservation of natural scenery for more than ten years, and as head of the department she also directs the division devoted to the Lincoln highway. She is not content with the national monument for the public. The national monument, you understand, differs from the national park in that it is not so permanent an asset. The monument is an area set aside for national uses by an act of the president, which, however, any future president can repeal at his pleasure. On the other hand, an act of Congress makes the area a national park, safe for all times as a public playground glorified.

Had Congress not adjourned as soon as it did the United States now might have two

From the Woman's Viewpoint

additional national parks, as the Sawtooth National Park and Mount Baker National Park Bills had been reported out of the public lands committee of the House. As it is, the bills will have to be reported again before they can be passed upon.

But what the organization is starting now is the campaign to eliminate undesirable signs from the highways, which the motorist follows. The campaign was endorsed by the general federation in convention a year ago. That it can be carried to an end successfully may be seen in the laws already passed by seven states, who have made it unlawful to post advertising signs within the limits of a highway.

First Highway Sign Laws

Says the law of New York, which was passed in 1911:

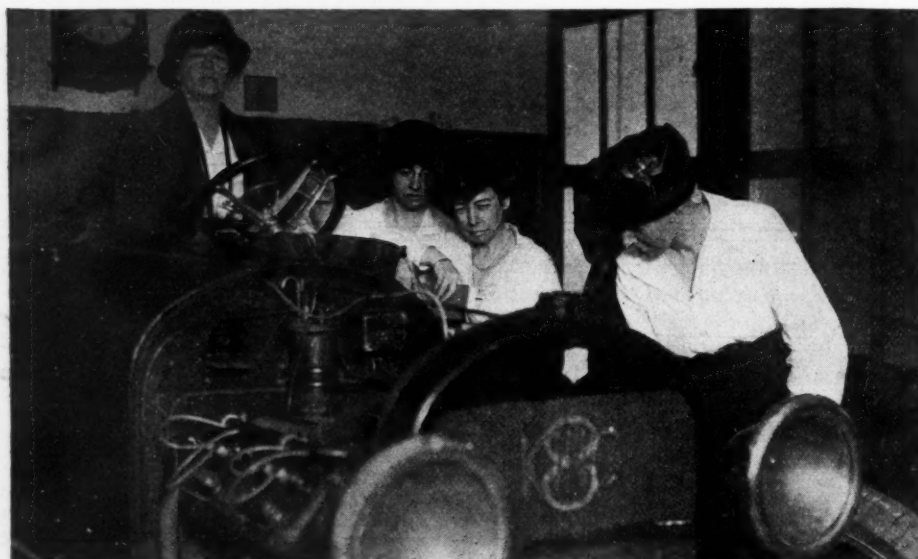
"A person who in any manner paints, puts or affixes any business or commercial advertisement on or to any stone, tree, fence, stump, pole or other structure, which is the property of another, without first obtaining the written consent of such owner thereof, or who in any manner paints, puts or affixes such an advertisement on or to any stone, tree, fence, stump, pole, mile-board, mile-stone, danger-sign, danger-signal, guide-sign, guide-post, billboard, building or other structure within the limits of a public highway is guilty of a misdemeanor. Any advertisement in or upon a public highway in violation of the provisions of this subdivision may be taken down, removed or destroyed by any one."

The fine, ranges from \$5 to \$25.

The Pennsylvania law attaches a penalty of "not less than \$5 or more than \$20;" Massachusetts, of not more than \$50. Connecticut makes possible a penalty of imprisonment, as well as a fine limit of \$100, while Maryland limits the fine to \$10. Each law tending to remedy the matter provides for permission to tear down the signs, and Massachusetts goes further and sets aside a Tear-Down Week.

The conservation department, of which Mrs. Sherman is chairman, is seeking to obtain more legislation to this effect. Mrs. Sherman believes it as bad to put a sign on a tree as on a human being and if she had her way would have no sign on any trees. For this reason she can and does give her whole heart to the work, and this is her third year in this particular part of the federation's work.

May 10-12 the federation's council will meet in New Orleans, and the signboard will be a feature of the meeting. It is a popular subject for discussion in meetings throughout the country, Mrs. Sherman



While women are being taught to drive cars, they are preparing to give motor service in war emergency with ambulances, for instance. Above is a class taken at a Y. W. C. A. branch in New York

says, and talks on elimination of undesirable signs along highways with the idea of improving the scenery are greeted with much encouragement.

Not only does the organization endeavor to obtain state legislation to remove signboards from the highways, but it seeks city ordinances. In connection with this work, it is endeavoring to mark the river crossings so that motorists always can know what stream they are crossing. While streets and roads are becoming better marked all the time, the stream remains unmarked usually. It is the department's idea to name the stream if no name has been given to it.

To Save Dunes Also

An effort is being made to get the Indiana, Illinois and Michigan clubwomen to combine to save the sand dunes between Millers and Michigan City, Ind., with a view to their preservation as a national park. The three state federations are to have a joint meeting in Chicago the latter part of next month to consider means of raising money to buy the sand dunes. This, of course, will mean another attraction for the motorists. Even now, undeveloped as this attraction is, it draws many motorists to it each year.

Unique among the accomplishments of the women of this organization, however, is that whereby the state federation in Florida finds itself sole owner and manager of a state park, the Royal Palm Park. Mrs. Sherman helped dedicate this last April. The park consists of 1000 acres of Royal palms and tropical growth. The federation is the only division of the organization that owns a park.

Summing up the work of the general federation, and the conservation department in particular, Mrs. Sherman makes the point that if the American people have three billion leisure moments, as statistics say they have, then why not do everything possible to give them opportunity for full enjoyment of these leisure moments through natural scenery both in parks and along highways?

That this enjoyment can be made possible is the basis on which Mrs. Sherman is working. The Rocky Mountain National Park was her first cause along this line, though she has since been champion for many others. As representative of an organization composed of more than two million women, with more than 9,000 clubs and represented in every state in America, besides in seven foreign countries, she naturally feels that the results of the highway campaign cannot be other than successful. She herself lives in Estes Park—when she can take a recess from her work—and in a region where everybody motors, especially to Estes Park, 40 miles from railroad transportation. And she is helping speed the day when people will motor through country unspoiled by glaring signs to the beauty of natural scenery, safeguarded in parks.



Mrs. Zona Berg and her mother, Mrs. J. H. Kesterson, made the drive between Detroit and Superior, Neb., recently. Mrs. Berg sells cars at Superior and needed more cars, so she went to the factory for them and drove four cars back to her trade territory

When Railroads Fail She Has a Driveaway

ALL things come to him, or her, who waits, did somebody say? Well, that must have been before the day of the freight tie-up. For many a dealer and would-be owner has waited and still is waiting for his particular car, and he who waits in this case often finds such waiting all in vain. There are some things that just must be coaxed to travel the right road, and the motor car is one of the "some things" when freight cars and flats prove unaccommodating. But all dealers do not await the whim of uncertain railroads, and Mrs. Zona Berg, a dealer at Superior, Neb., is one of those who do not await it.

Mrs. Berg is a wholesale and retail dealer in cars, and she has just completed a driveaway from the factory of Dodge Bros. in Detroit to her Nebraska town, a difference of 1200 miles.

Only four cars made the driveaway, for be it understood it isn't such an easy matter to get drivers even in days of these emergencies, and it is quite some step from the Kansas border to the metropolis of motor cars. In the neighborhood of the driveaway was much snow and frozen ruts and a temperature that was consistent only in that it wavered between 15 below and 15 above from the beginning to the end of the trip.

Mrs. Berg drove the road-breaking car—and every once in a while the rest of them shoved her out. Her 12-year-old son, Jack, drove another car. Two of her sales mechanics had charge of the third and

fourth cars. The route led through Elkhart, Ind., South Bend, Ind., and Chicago, from near which it followed the Lincoln highway.

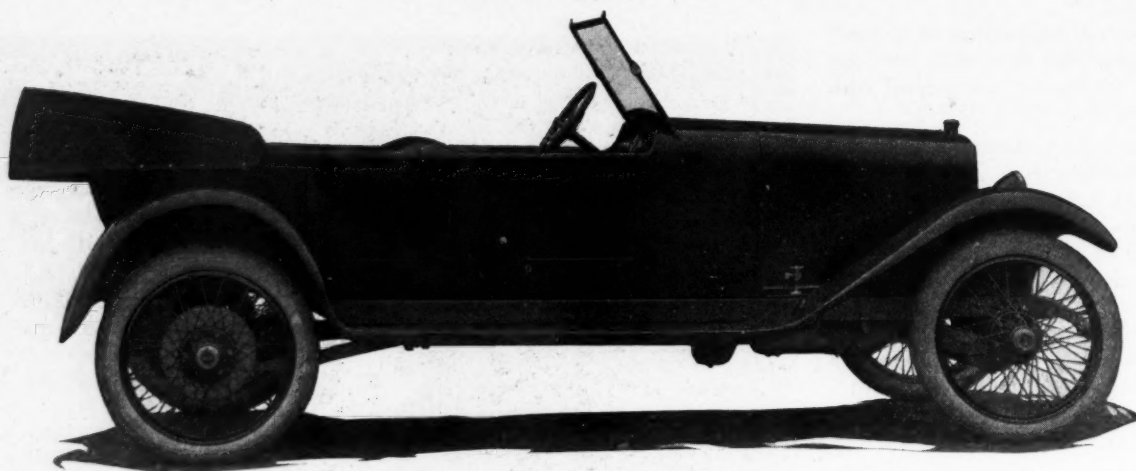
This is one of the few trips of this kind made by a woman dealer. It probably is among the longest of the driveaways made since the supply of freight cars for motor car shipments became so limited. That the trip was successful was evident in the condition of the cars on arrival at the Nebraska town. The drivers had practically no car trouble and very little tire trouble.

Water as Well as Ice

The cars found western Iowa a sea of water. They ran through swollen creeks and were held up for a while until the flood receded. The cost of the trip was reported as little, if any, more than actual freight, and Mrs. Berg declared that, with the trip ended, she saw no reason why one could afford to close up shop on account of freight car shortages.

With Mrs. Berg was her mother, Mrs. J. H. Kesterson, who is said to be the first woman who ever drove a motor car in Kansas. Mrs. Kesterson lacks two years of being 60 years old, but she, too, took her turn at a wheel. She is an enthusiastic motorist and never has gone on a motor-trip without driving part of the way herself.

Mrs. Berg's territory consists of four counties, two in Kansas and two in Nebraska. When her supply of cars became low and the freight shipment outlook grew more and more unfavorable she wired the factory, asking if she could have the cars if she came after them. The trip was the result.



The long, low body on the Cameron six. Wire wheels and cord tires are standard equipment

Low Weight Carrying Cameron Feature

Front Axle a Steel Stamping—Rear Springs Adjustable for Load

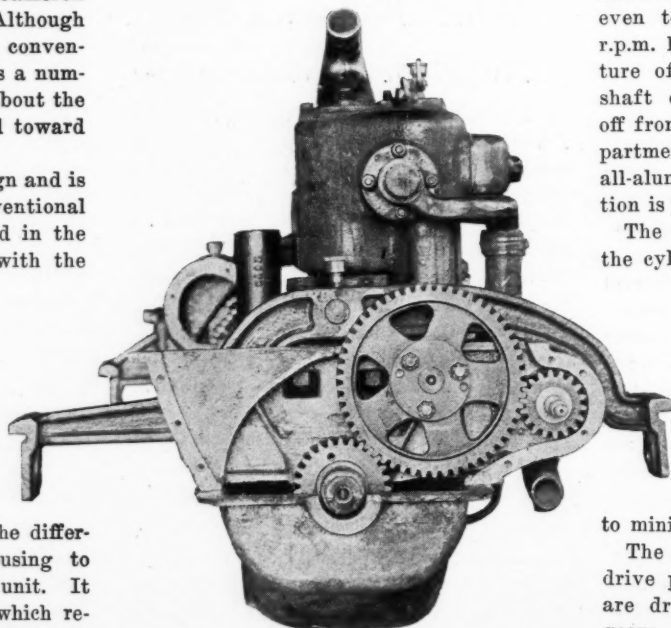
LOW weight carrying is probably the prime feature of the new five-passenger and roadster Camerons selling for \$1,250. These are products of the Cameron Motors Corp., Norwalk, Conn. Although there is no great divergence from conventional construction, the chassis has a number of modifications which bring about the low weight carrying and also tend toward exceptional light weight.

The rear axle is of Cameron design and is one of the modifications of conventional practice. The gearset is embodied in the rear axle unit and is connected with the powerplant through a drive shaft and a single universal. Both torque and propulsion are taken through radius rods and a heavy torque tube which joins the clutch housing through a ball joint of liberal proportions. The clutch is a Bork & Beck dry-plate disk. But it is in the rear axle and its suspension that the difference lies. The pressed steel housing to which the gearbox is bolted is a unit. It is fitted at the ends with collars which receive the radius rods and form spiders for the entire rear axle brake-operating assembly. These also carry cover disks which inclose the internal brakes, keeping them free from dust and dirt. Both service and emergency brakes are of the internal expanding type.

Rear-axle spring suspension is of a new type. This is a long, floating cantilever with an adjustable feature. These springs have the usual pivot point on the frame side a little back of the front end of the spring, but instead of the extreme end being attached by a shackle there is an adjustable attachment by which the spring can be raised or lowered in relation to the frame, so varying the strength to suit dif-

ferent conditions of load or road surface.

The front axle is probably the greatest departure in the entire construction. **It is**



Front of Cameron engine with gearcase removed. Note the solid construction of the front engine support

a Cameron product of Cameron design. The axle is made of heavy-gage pressed steel, in reality a stamping. It combines ample strength with a very advantageous reduction in weight. The open side of this steel channel is in the back. Where the strain and vibration is greatest, an additional strip of metal is welded on, giving the axle four sustaining sides at that area. Nickel-steel spools welded on either end of the axle stamping carry the steering knuckles.

For power there is a six-cylinder Amco engine. This is a block-cast, L-head type

with 3 by 5-in. cylinders. It carries a carefully counterbalanced crankshaft on three bearings. Although this engine is rated at 22.5 hp. it is said to maintain an even torque at high speed and at 3000 r.p.m. has shown 49 and 50 b.hp. A feature of the engine is the separate camshaft compartment. This is partitioned off from the main crankcase, and the compartment carries its own bath of oil. An all-aluminum crankcase is used. Lubrication is by combination splash and pressure.

The intake manifold is integral with the cylinder casting. The idea of this, of course, is to preheat the gas charge before it enters the cylinders. The exhaust manifold bolts to the side of the cylinder casting and at the back of the engine has approximately three times the gas capacity as at the front. This funnel construction of the exhaust is designed to minimize back pressure.

The generator, water pump and fan-drive pulley are assembled in a line and are driven through the helical camshaft gears. This water pump is of the centrifugal type.

The carburetor is a Zenith with a hot-air stove. Gray & Davis electrical equipment is used throughout. The generator as previously stated, is driven from the water-pump shaft. The starting motor is bolted to the bell housing in the rear and engages a gear on the flywheel with Bendix pinion. There is a Gould battery of the 6-volt, 80 am. hr. type. Fuel feed is through a Carter gravity tank with a 16-gal. gasoline tank in the rear in which is embodied an auxiliary gasoline-supply feature and a gage.

The steering gear is of the worm and full-gear type, and the post carries an 18-in. corrugated wheel. The tie rods are

fitted with ball and socket joints, and there has been a care in the design and in the assembly to prevent rattles at these points.

The body is a snappy looking streamline type with even curves from front to rear. Wire wheels with one extra are standard equipment. These are fitted as standard with cord tires, 32 by 4. The fenders are crowned and built with the welded seam construction. Running boards are steel and are trimmed in linoleum and aluminum. These running boards are bolted to the lower edge of the frame member so that the usual skirt and running board brackets are eliminated.

The windshield is unusual in that it carries a single pane of glass. It is slanted back at an angle of 30 deg. and is secured to standards which are anchored to a long, webbed aluminum casting which forms the cowl of the car. This cowl construction is also something out of the ordinary.

The cushions of the seat are deep and sloped at a comfortable position. Another feature of Cameron offering which is right in line with up-to-date practice is the color selection whereby the owner can, at no extra cost, choose from a liberal variety of colors to suit his individual taste.

There is a roomy luggage compartment in the rear. There are carpeted floors and a complete tool equipment.

TO TEST ARMY TRACTORS

Fort Sam Houston, Tex., March 9—The new caterpillar tractors which are to become a part of the military service on the Rio Grande border are being mobilized at Fort Sam Houston, Tex. The first two of the six tractors that are to be assembled here for tests as to their efficiency have already arrived from Marfa, Tex.

One of the trials will be made by the engineering corps to ascertain their value as a means of locomotion for pontoon bridge equipment trains.

Caterpillar tractors have been used suc-

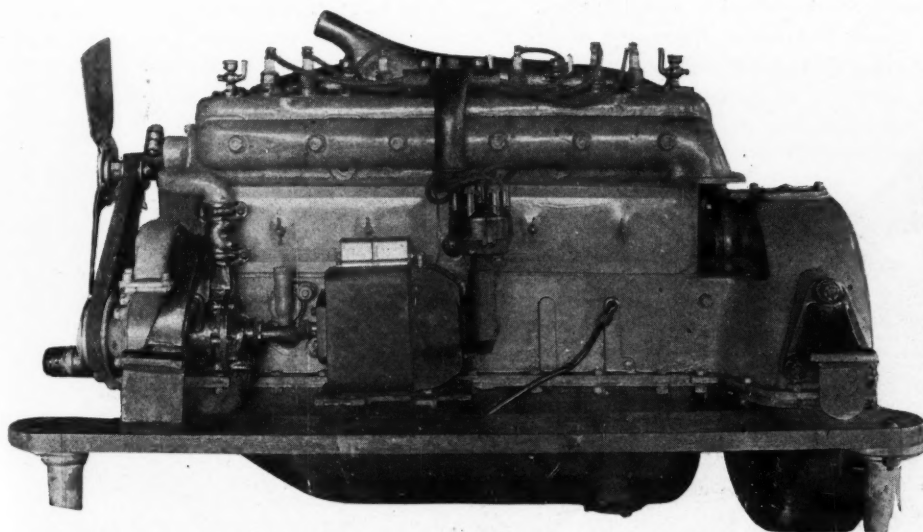
cessfully in the Big Bend district to convey supplies and ammunition from one place to another. There are no railroad lines in the vicinity of the camps of troops on border duty in that part of the country, and the land is exceedingly rough and almost roadless.

MONARCH BUYS CHRISTENSEN

Milwaukee, Wis., March 9—The Christensen Engineering Co., Milwaukee, Wis., has disposed of its plant and business to a new corporation organized under the name of Monarch Machine Works of Milwaukee and capitalized at \$200,000, which will continue the business of manufacturing automatic screw machines, gasoline engines, air compressors, pneumatic starting devices for internal combustion engines and the other lines of products now being made. The Monarch company is owned by William J.



Complete rear axle and drive assembly of the Cameron. The unique features of this assembly are explained in the description



Exhaust side of the 3 by 5 Amco engine used in the Cameron. Light weight was a big factor in its design

Koehring and Philip A. Koehring, who also are the chief stockholders in the Koehring Machine Co.

GOODYEAR INCREASES CAPITAL

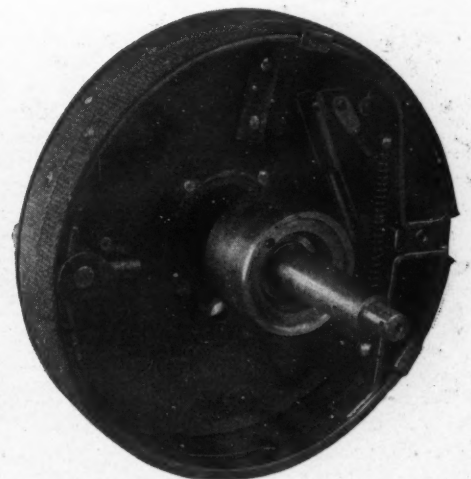
Akron, Ohio, March 9—The Goodyear Tire & Rubber Co. will issue \$6,000,000 worth of new preferred stock and \$3,370,000 worth of new common stock. This will give the company outstanding stock of \$23,500,000 preferred and \$29,870,000 common. Purpose of this stock issue is in line with the company's expansion policy and for additional working capital. The preferred stock has been sold to a banking syndicate, and the common stock will be offered to the present common stock holders of the company at par value.

TAKES OVER RETLAW PLANT

Detroit, March 10—The Detroit Gauge & Metal Co. has been incorporated for \$50,000 and assumes the entire business and plant of the Retlaw Mfg. Co., maker of gasoline gages. The company will continue the manufacture of gages and also metal stamping. Officers are O. S. Kelly, president; E. C. Lewis, vice-president; S. Livingstone, secretary and treasurer. E. S. Kelly and W. Livingstone are named as directors of the company. The former is a retired capitalist who was at one time founder and general manager of the Kelly-Springfield Tire Co. and president of the Kelly-Springfield Motor Co.

PURCHASES BODY PLANT

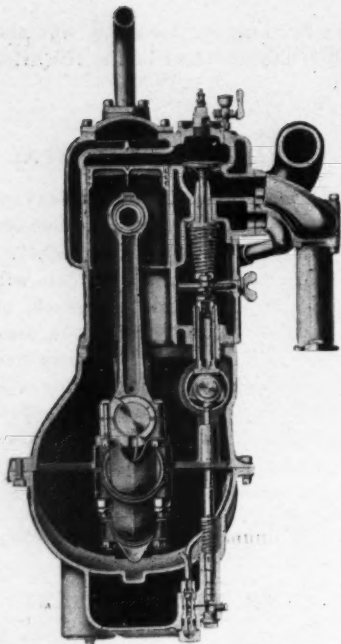
Detroit, March 9—Frank Bros. Iron & Metal Co. of this city, has purchased the land, buildings, and equipment of the defunct Victor Mfg. Co. of Detroit, motor car body builder. The building has a floor space of 38,000 ft., and includes a power plant and dry kilns.



Both sets of brakes on the Cameron are internal expanding. Note the simple cam operation

What Continental Offers

Has Six Engines for Many Uses 13 Years of Power-plant Building Experience



End—sectional view of model E, showing cooling area over combustion chamber

THIRTEEN years of engine-building specialization are back of the six powerplants offered to builders by the Continental Motor Corp., Detroit. The models are designed to cover the entire vehicle field from the four-cylinder truck and tractor engines to the small and large six-cylinders for passenger cars.

All new models are continuations of those marketed a year ago with refinements of a minor rather than a fundamental nature. Certain alterations are noticeable throughout the different models. One important improvement is in the balancing of the crankshafts. These are put in perfect running balance on a special machine designed by Continental engineers and upon which patents are pending.

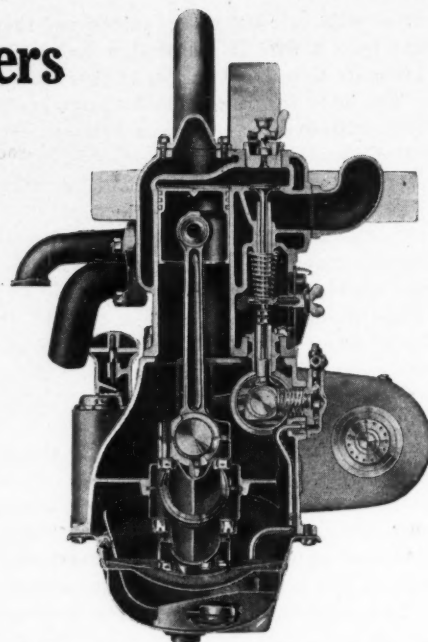
Crankshafts in all models are stiffer, however, without material weight increase. This added strength has been gained either by an increased diameter of the shaft or increased cheek thickness. In all models a change has been made in the finishing of

the cylinders in that they are now finish-ground instead of lapped. The crankcases and connecting rods of the different models also show changes which tend toward greater rigidity. Of a minor nature is the improved grinding on all parts upon which this operation is required.

The model 7 W six-cylinder car might be considered the leader of the line, inasmuch as it is used on a considerable number of well-known cars. It is upon this model that the greatest number of alterations have been made. Here is found increased crankshaft rigidity due to the use of stiffer crank cheeks. The shaft diameter remains the same, but the bending moment is 50 per cent greater than it was, due to the heavier cheeks and incidentally to improved heat treating.

The engine has also been given increased volumetric efficiency by rearranging the valve action and increasing the lift from $\frac{1}{4}$ in. to $\frac{3}{8}$ in. An improvement has been made in the pistons, which now have three rings instead of two. The rings are $\frac{3}{8}$ in. in the present design instead of $\frac{1}{4}$ in. as previously. Another improvement is in the oil pump which, through a rearrangement of the check valves, has now been made to have better priming qualities. The water inlet is now in the longitudinal center of the cylinders, whereas it was at one end. Another improvement in the water system is that the cooling liquid is carried higher around the valve stem than formerly. There is a better oil indicator on the new engine, having a direct reading showing the degree to which the crankcase is filled with oil in actual figures.

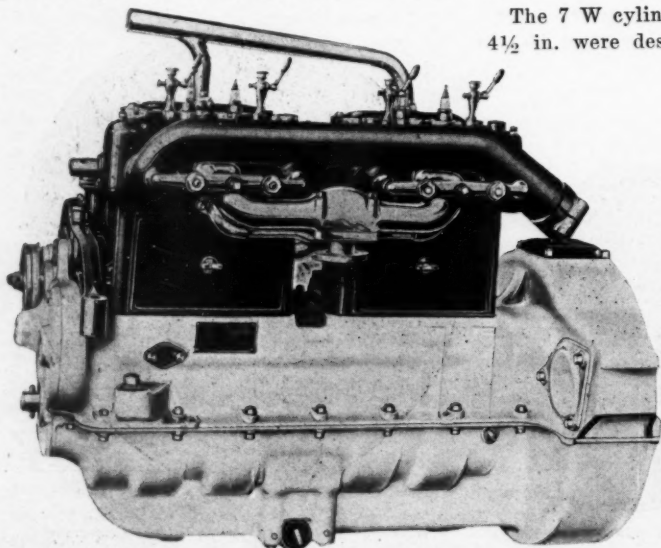
The 7 W cylinder dimensions of $3\frac{1}{4}$ by $4\frac{1}{2}$ in. were designed to meet a demand



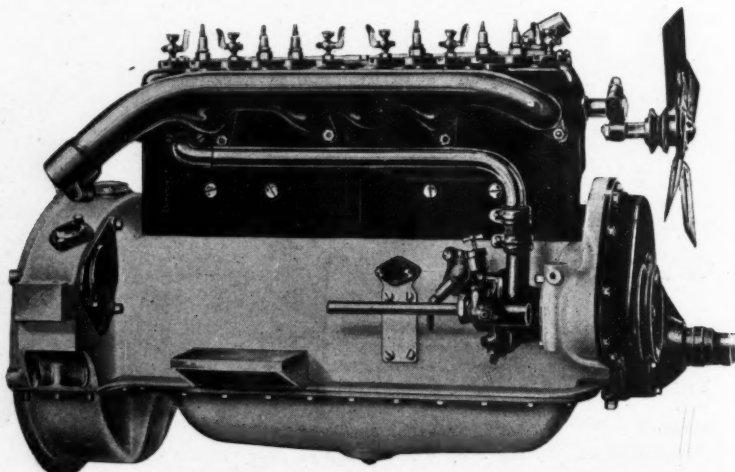
End—sectional view of model N, showing oil-pump operation from cams

on the part of builders for a medium powered six which would be capable of withstanding hard service and at the same time be an economical engine, both from the standpoint of the car manufacturer and the user. In this engine the six cylinders and the upper half of the crankcase are cast together. The cylinder head is cast separately, and the lower half of the crankcase is pressed steel. It is claimed that with the pressed steel pan several pounds of weight is saved over a cast aluminum case. The engine thus is made up of two iron castings and a pressed steel pan as far as the exterior is concerned.

The pistons are $3\frac{1}{2}$ in. long and carry a piston pin bearing, $\frac{7}{8}$ in. in diameter and $1\frac{1}{2}$ in. in length. In fitting the rings to the piston grooves and cylinders, a close fit is made with the rings ground on both face and sides. The rings are of the concentric expansion type, and all the engines are run under separate power to fit the rings to the cylinder before they are put on final test. Oil grooves are also turned on the exterior of the piston.



The four-cylinder model E Continental, a heavy-duty four



The model 7N six-cylinder powerplant with a bore and stroke of $3\frac{1}{4}$ in.

For the piston pin No. 3 annealed steel tubing is used. This is also hardened and ground and is held stationary in the bosses by a locking device. The bearing is carried in the upper end of the connecting-rod and is in the form of a large bronze bushing of dimensions as given. To lubricate this bushing there is an opening in the upper end of the connecting rod which catches oil from the splash system.

A three-bearing crankshaft is used. The shaft is made from crankshaft steel, drop-forged and heat-treated, giving a tensile strength of over 100,000 lb. per square inch. A feature of the shaft which has been given attention is the matter of taking the clutch thrust or thrust in the other direction by means of flanges which are provided on both ends of the front bearing.

All the bearings for the crankshaft, camshaft and connecting-rods are of nickel babbitt. The camshaft and crankshaft

directly operating the inclosed valves. The inlet and exhaust valves are interchangeable and have nickel steel heads electrically welded to carbon steel stems. The ends of the valve stems are hardened to take the wear resulting from the action of the tappets. The valve stem locking device is a patented design and the entire mechanism is exposed by the removal of the metal side plates which cover the valve action, keeping them free from dirt and tending to quiet the valve action.

In the arrangement of the manifolds the exhaust is carried on the valve side and is separately cast and clamped to the cylinder. Copper asbestos gaskets are placed between the connections of the manifold to the cylinder. A feature is that the exhaust manifold does not interfere with the adjustment of the valves, valve springs, etc.

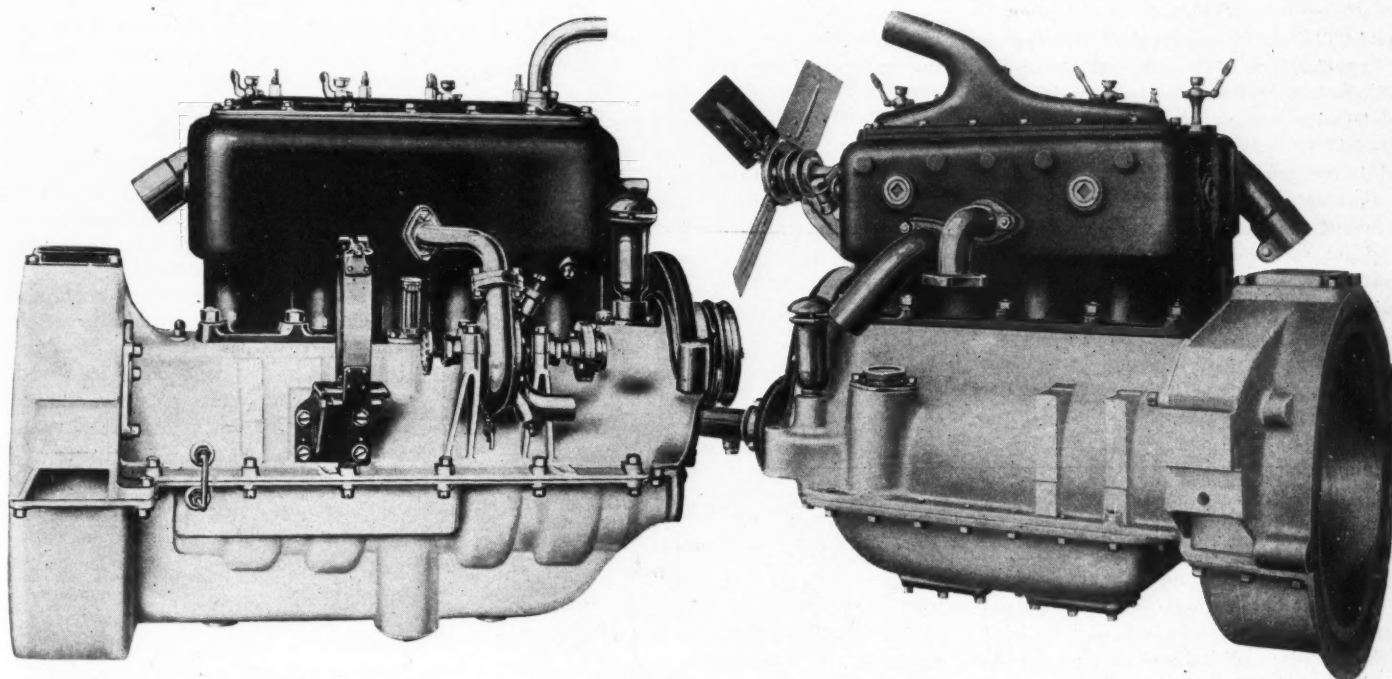
The cooling is by centrifugal pump fitted

port plug wrench. The flywheel and rear crankshaft extensions are machined to meet the specifications of the manufacturer.

Ignition equipment is not included as stock. The Continental company, will, however, at a slightly extra charge, mount, time and test magnetos which are shipped to them by car assemblers who buy their product.

Model 7 N, Six-Cylinder Engine

The same standards of manufacture as were mentioned for the 7 W are followed in the 7 N, which is a larger six. This has a bore and stroke of $3\frac{1}{2}$ by $5\frac{1}{4}$ in. and differs from the 7 W in that it has the cylinder cast in block with the crankcase a separate aluminum casting. It is also a solid head unit, whereas the 7 W has a separate head. The water jacket heads on the 7 N are cast separately and are re-



One of the Continental fours, showing water pump mounting and drive from timing gears. On the right is the model N four, which is the smallest engine of the line

are backed with bronze which, being a good conducting agent, helps in keeping the bearing cooled.

Helical steel gears which are cut on hobbing machines are used. There are three gears to the timing set, composed of a crankshaft, camshaft and pumpshaft gear. These are housed in the case on the front of the engine. The camshaft is drop-forged from low carbon steel and runs in long bronze backed babbitt bearings. The camshaft, being rough machined and annealed, is heat-treated, hardening it throughout. It is then finish-ground to accurate size on a camshaft grinding machine. The camshaft may be withdrawn from the crankcase by simply removing the gearcase cover.

Mushroom types of pushrods are used. They are made of carbon steel with the heads and stems ground to size. They bear directly on the cams and in turn, di-

rectly to the engine as standard equipment. It is provided with two bearings fitted with stuffing boxes and equipped with a drain cock so that the water can be drawn off during freezing weather. Oiling is by combination splash and pressure system. The oil is circulated by an improved plunger pump driven by an eccentric from the camshaft. This forces oil directly through copper tubes to the timing gears and main bearings. From these points it drains back into the oil pan, maintaining a proper level for the splash lubrication which takes care of the pistons, connecting-rods and valve push rods.

The fittings which are given as stock equipment on the Continental engines, unless otherwise specified by the manufacturer, include water connections, adjustable fan bracket, a ball bearing fan, a fan pulley adapted for $\frac{3}{4}$ in. flat belt and a

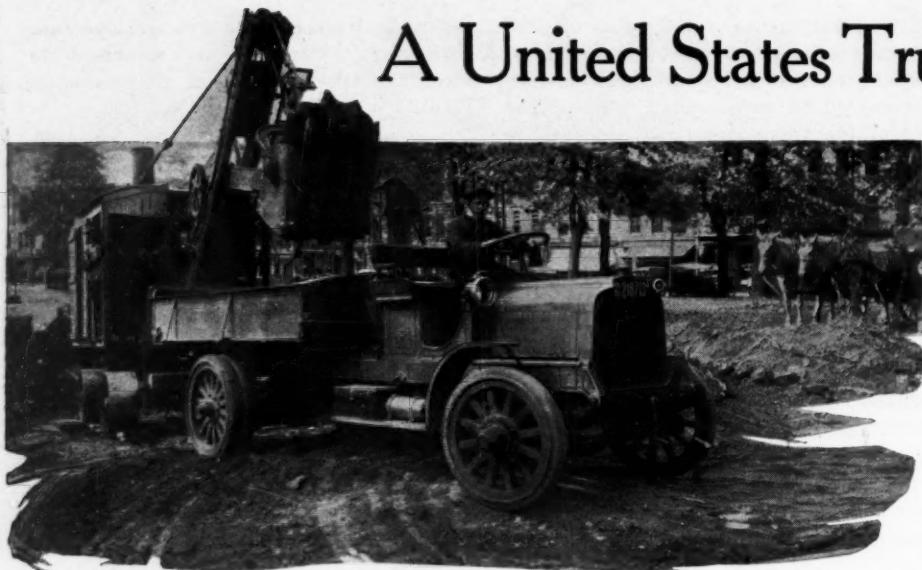
tained by screws, a construction which greatly improves the accuracy of the core work in the cylinders and insures better castings owing to the increased ease of obtaining uniformity. No change has been made on the 7 N engine as compared with a year ago, except that the S. A. E. standard bell housing is now given as an option. Pistons are of the same iron as the cylinders and this same casting material is used also throughout the Continental line. The pistons have three rings of the concentric type and also have the oil grooves turned on the outside for oil distribution.

Practically the only difference in construction in this engine as compared with the 7 W are those necessitated by the use of a separate aluminum crankcase and by the fact that the parts must be larger to

(Concluded on page 39)

A United States Truck for All Work

Five Models from 4000 to 10,000-lb. Capacity



A United States truck in operation. It is fitted with a standard contractors' steel dump body

PRACTICALLY every kind of buyer is appealed to with the complete line of United States trucks, comprising five models with capacities ranging from 4000 to 10,000 lb. A marked absence of non-flexible construction is probably the greatest feature of the trucks. By this it is not meant that the operation lacks in flexibility but rather that the mechanical construction is of such flexible character as to eliminate the transmission of strains from one unit to another.

An example of this is found in the suspension of the powerplant. The entire power-delivery system floats inside the chassis frame and maintains a perfect alignment of the propeller shaft, regardless of the distortion of the frame. To gain this, the engine is carried on a sub-frame which is mounted on the main frame at two points in front and supported there on spiral coiled springs. The rear end is anchored by a ball and socket joint which permits unhindered movement in any direction. Of course such construction has its purpose in eliminating breakage of the crankcase supporting arm and eliminating binding from the frame when encountering road inequalities.

There are two chain-driven trucks having 2½ and 3½-ton capacity and three worm-driven types with capacities of 2½, 3½ and 5 tons. Each has a special type of gear characteristic of United States design. In this the gears are always in mesh. In the worm drives, when running on high gear, a solid drive is given from the engine to the rear axle. This is brought about by the use of dog clutches. The control and brake levers also are departures from common practice. These are in unit with the seamless-steel gasoline tank and the cradle on which it rests.

Other than these features the trucks are quite conventional in design. The engine is a four-cylinder, L-head type lubricated with combination of force and splash. Ignition is by a Duplex magneto in com-

bination with dry cells for starting. Cooling is handled through a circulation pump and a horizontal-square tubular-core radiator. This radiator is suspended in a steel cradle supported on coil springs to minimize vibration transmitted to the radiator core. Anti-friction cotton webbing is inserted to give additional cushioning.

Again referring to the diversity of the line for many different needs, there is an engine of different size for each model manufactured. Thus there is a power for the needs of every load. The 2½-ton models, known as E and H, have 4½ by 5¼ engines having an N. A. C. C. rating of 27.2 hp. The governor, which is controlled in conjunction with the throttle lever, allows a maximum engine speed of 1160 r.p.m. On the 3½-ton models D and J the engine is 4½ by 5½ with an N. A. C. C. rating of 32.4 and the speed governed at 1090 r.p.m. On the 5-ton model K the engine is 4¾ by 6¾ bore and stroke, giving an N. A. C. C. rating of 36.1. Here the maximum engine speed is held to 900 r.p.m.

Between the engine and gearbox are two universals. As the gearbox is located

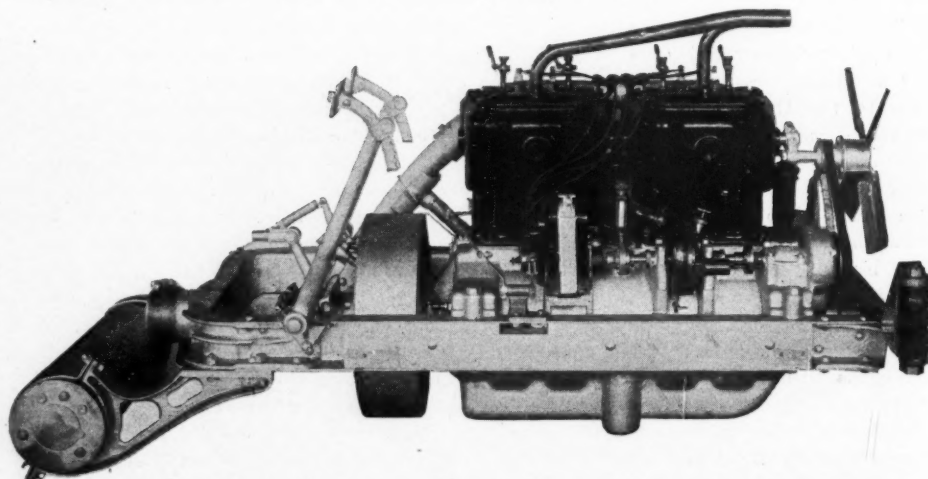
amidships the necessary weave of the frame has no straining effect on the drive line because of these two universals. The gearbox is swung on two supports to two cross members of the frame.

Beyond the gearbox the designs differ in the worm-drive and chain-drive models. The models E and D are chain-driven and the models H, J and K are worm-driven. The only similarity is in the drive layout principle of eliminating torsion or radius members by absorbing torque and propulsion through the springs with the Hotchkiss principle.

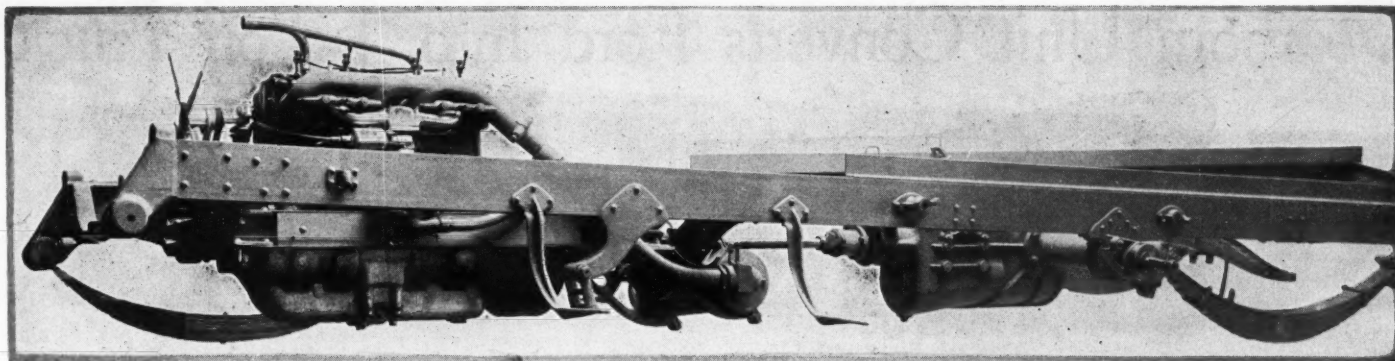
In the chain-drive models the differential is a part of the gearbox unit. Out of this unit comes the jackshafts with sprockets at each end. The rear axle is dead, being a solid bar of heat-treated vanadium steel. The rear system in these models is suspended from the frame at three points on ball and socket joints, permitting free movement when weaving of the frame occurs. The rear axle is suspended on semi-elliptic springs with an auxiliary cross spring. This cross spring serves to carry heavy loads. When the truck is running light the cross spring is free at its ends and only comes into play when the truck is heavily loaded or encounters deep ruts on one of the rear wheels.

The worm-drive trucks carry drive to the rear axle through worm and differential in conventional fashion. On all models about 80 per cent of the load is carried over the rear axle.

The factory offers varied types of bodies for the different chassis. The hydraulic hoist dump bodies are ones upon which the builders make particular emphasis. They are all steel structures with a hydraulic dumping mechanism, operated by the powerplant of the car.



Right side of engine and sub-frame as used on the models J and D. The suspension of all other models is similar



An experiment conducted on a U. S. chassis. The main frame is abnormally twisted while the sub-frame bearing the engine receives none of the twist

What Continental Offers

(Continued from page 37)

take the greater stresses, due to the increased displacement. The bearings are all carried in the crankcase.

While the N. A. C. C. rating of the engine is 29.4 on block test, this engine will develop 50 hp. at approximately 1900 r.p.m. The piston rings are $\frac{3}{8}$ in. in width. This is a higher engine than the 7 W, having a connecting-rod length of $10\frac{1}{4}$ in.

Helical-cut timing gears are used. The valve diameters are $1\frac{1}{8}$ in., with a stem diameter of $\frac{3}{8}$ in.

As regards lubrication, the same system is used on this engine as on the 7 W, oil being fed by a plunger pump driven by a concentric camshaft direct to the timing gears and the main and camshaft bearings. The oil drainage then flows into the crankcase splash pans. The same fittings and the same equipment is given with the 7 N as with the 7 W.

Model 6 P Engine

The Continental 6 P is a still larger six, having a bore and stroke of $3\frac{3}{4}$ by $5\frac{1}{4}$ in. This gives an N. A. C. C. rating of 33.5 hp., and the power developed is 48 at approximately 1500 r.p.m.

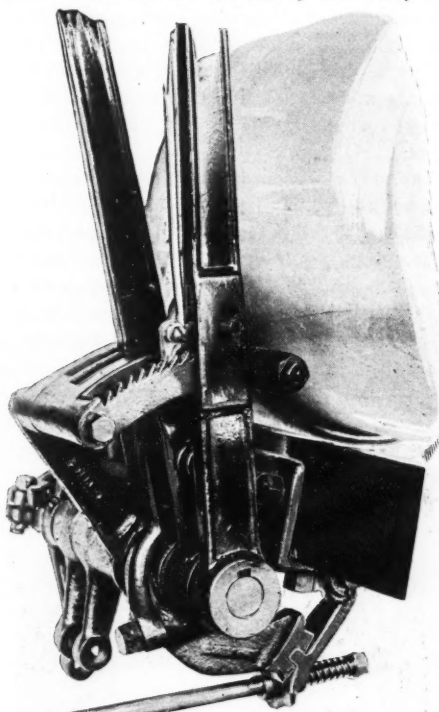
Four-Cylinder Engines

Three four-cylinder Continental engines are made to take care of the range of requirements in this class. These are known as Models N, C, and E. Model N is the smallest; C is the medium size, and E is for larger installations. The C type engine is now known as Model C 4, superseding the Model C and incorporating several changes, having increased the general rigidity. The crankcase is now $1\frac{7}{8}$ in., whereas it was $1\frac{3}{4}$ in. This has caused a corresponding enlargement of the bearing diameters in which the increase has been about $\frac{1}{2}$ in. in diameter in all three bearings. The crank-pin diameter has also been increased and the I-section of the connecting rod also stiffened.

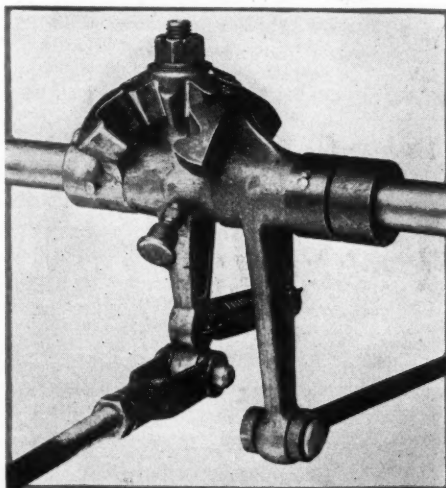
Model C 4 is particularly adapted to truck use. It is made in two bores— $3\frac{3}{4}$ or $4\frac{1}{8}$ in. with the same stroke of $5\frac{1}{2}$ in. This gives two piston displacements; one of 232 cu. in. and one of 281. It is designed particularly to handle heavy loads continuously and hence is made up of parts

capable of withstanding continued stresses.

The practice in the manufacture of the four-cylinder engines follows very closely that described in the manufacture of the six. There is a difference, however, in



This illustrates the safety lock on the gearshift. There is a notched sector into which a latch fits



The simple brake equalizer used on U. S. trucks

the crankcase and oil pan, which are separate, as in this instance both are aluminum castings.

In general design the description of the C type engines follows that of the others. Different mountings are furnished with either three or four-point suspension, and it can also be adopted to main frame or subframe connection. The standard engines can be supplied in either $17\frac{3}{4}$ in. subframe mounting or $26\frac{3}{4}$ in. main frame mounting. The Model C 4 is furnished with water pump. Cooling can be supplied with thermo-syphon water system if desired.

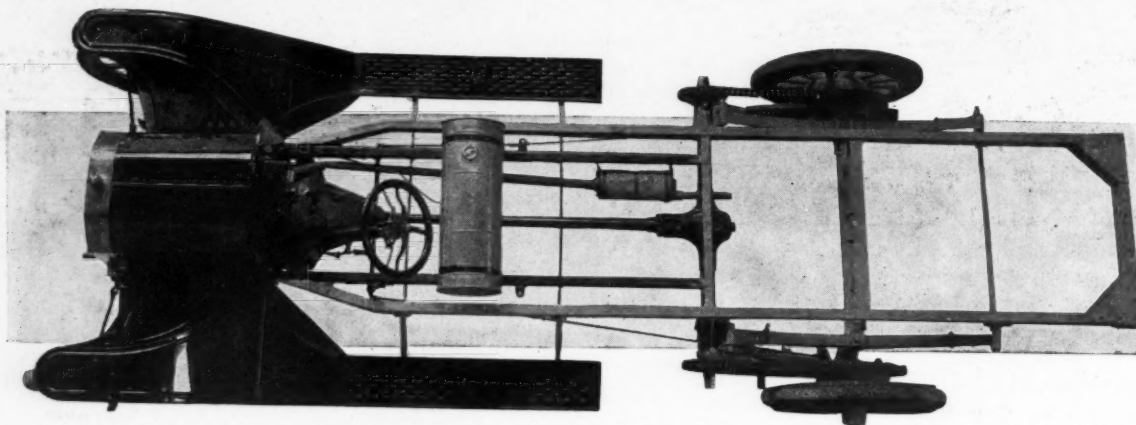
Model N 4 Engine

In the Model N four-cylinder engine, which is the smallest engine made by the Continental company as stock, the dimensions are either $3\frac{1}{2}$ in. or $3\frac{3}{4}$ in. bore, with 5 in. stroke. This is a moderately light engine but is also capable of withstanding continuous service. It is designed as a compromise between the higher speed type and the heavier type of commercial four-cylinder engine. It reaches its highest efficiency at about 2000 r.p.m. This engine has block-cast cylinders with the crankcase separate as an aluminum casting and a pressed steel oil pan. The general plan of construction is the same as for the other Continental engines with thermo-syphon cooling being used instead of pump. A centrifugal water pump can be attached, however, if desired.

Model E Engine

The largest four-cylinder engine made by the Continental company is Model E. It has a bore and stroke of $4\frac{1}{2}$ by $5\frac{1}{2}$ in. This particular type of engine is used in a great many 3-ton trucks. The cylinders are cast in pairs and are L-head. An increase in the shaft diameter has been made from $1\frac{7}{8}$ in. up to $2\frac{1}{4}$ in. This has also given a corresponding increase in main bearing sizes, these being all $2\frac{1}{4}$ in. in diameter instead of $1\frac{7}{8}$ in. as previously. This engine has a three-bearing shaft, and other than for the changes due to the casting of the cylinders in pairs and in the use of cast aluminum for both the crankcase and oil pan, the manufacturing practice is parallel to the other engines mentioned. The N. A. C. C. rating is 32.4 hp., and the power developed on the block is 45 at 1500 r.p.m.

Dearborn Unit Converts Ford Into 1-Ton Truck



This view shows how the Dearborn unit is attached to the side of the Ford frame. Note that the Ford rear axle is used as a jackshaft

A COMBINATION of the Ford model T chassis of any year and the Dearborn converting unit, made by the Dearborn Truck Co., Chicago, gives a 1-ton truck. The frame of the unit is 14 ft. long and runs up to the radiator on the Ford chassis. It fits snugly and does not require any cutting of the Ford fenders at the dash. The whole unit is light in weight, simple in design, yet thoroughly sturdy.

This unit is practically the rear half of a standard 1-ton truck. It is so designed that 90 per cent of the load is carried on a rear dead axle with its heavy truck wheels. The claim is that there is less weight carried on the front axle when converted with a Dearborn unit than there is on the front axle of the standard Ford touring car. Of course the balancing of the load on the rear axle gives greater driving power and traction than if it were located nearer amidships.

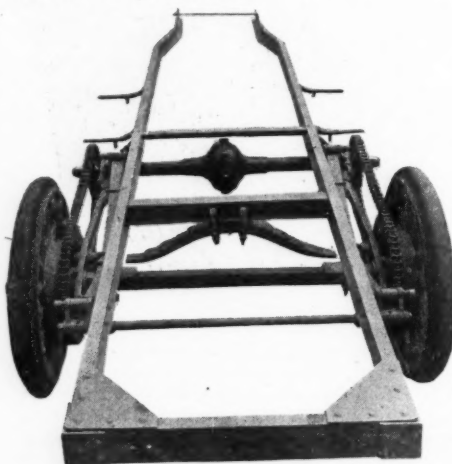
The truck is chain driven, using the Ford rear axle as a jackshaft and suspending it on brackets on the Dearborn frame. Sprockets take the place of the Ford rear wheels and from this drive is conducted through chains on each side to the rear axle. Differentialization of the unequal wheel-turning effort in turning is taken through the Ford differential.

The Dearborn frame, made of 4-in. rolled-channel steel, is bolted to the front of the Ford frame with three bolts on each side of the engine, then bolted to the Ford body flanges immediately back of the dash. The rear ends of the two side members of the Ford frame are riveted to the cross member on the Dearborn frame just above the rear axle assembly of the Ford, which is converted into a jackshaft as stated, and held in place rigidly by hangers designed for the purpose. Both these jackshaft hangers and cross-rod hangers are hot riveted to the frame.

The rear dead axle is rectangular with a $2\frac{1}{4}$ by $1\frac{3}{4}$ -in section. It is a drop forging heat treated, with a carrying capacity of $1\frac{1}{2}$ -ton loads. The side springs are 2 in. wide, 44 in. long and have nine leaves.

There is a cross or relief spring over the rear axle 2 in. wide with six leaves. This spring is designed to compensate for overloading and reduce side strains on the side springs when irregular roads are encountered.

The truck wheels have 2-in. oval spokes and are equipped with Firestone solid tires. Bock heavy roller truck bearings are used. There are 12-in. emergency brake drums rigidly bolted to the hubs. These use $2\frac{1}{2}$ -in. shoes with a $\frac{1}{8}$ -in. Brakebestos lining. The Ford brake rod is lengthened and connected to the hand lever.



The complete Dearborn unit before attachment

Unusual in Ford attachments are the heavy step brackets for the running boards. These are riveted to the frame. Radius arms are carried from the dead axle on each side to the jackshaft hangers. These are malleable one-piece castings with adjustable swivel screws at the front ends. They have a free movement on the axle and are held in place by removable collars.

When attached to the Ford chassis the wheelbase of the converted unit is 125 in. The normal loading space is 8 ft. 10 in. back of the Ford gasoline tank, affording space for a 9-ft. body.

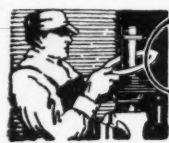
The complete attachment which will convert a Ford into ready-to-operate 1-ton truck chassis sells for \$350. The company also offers a variety of bodies to suit practically every need in a truck of this capacity. There are express bodies, stake bodies, panel bodies, furniture trucking bodies, flare-side bodies, etc. Special jobs will be made to order.

GOODRICH EARNINGS, \$5,568,764

Akron, Ohio, March 9—The B. F. Goodrich Co. in its final statement shows it has had net sales of \$70,990,781, as against \$12,265,679 in 1915. Net earnings for 1916 were \$9,568,764. The surplus after the preferred dividends had been paid was \$7,657,764, or 12.75 per cent on the common stock.



One of the Dearborn demonstrators. The flare-side body is made by the same company



The Motor Car Repair Shop



It Is Not Too Late for a Heater

MOTOR AGE readers are remembering the golden rule and answering our request for ideas to benefit the other fellow in the repair shop. Here are two good ones for this week. It is not too late yet to build a heater. There is plenty of cold weather coming, and it would be a good time to fit that heater when you have your car torn down for overhauling. Vernon Bowen tells you how to build one.

J. Edgar Finn tells you how to remove cylinder heads and put them back on again without having to replace the gasket every time. Some repairmen have the idea that removal of the cylinder head spells doom for the gasket, and with this idea in view they gouge and hack it to pieces in the process of removing the head. It is not necessary. Finn tells how to avoid it.

The ideas are good ones, both of them. So far the reader's batting average is high and the hints received are all helpers. Let's have some more.

About Removable Heads

Brooklyn, N. Y.—Editor MOTOR AGE—In removing and replacing the removable cylinder head I have found the following method to be the easiest and quickest:

Drain the water from the radiator.

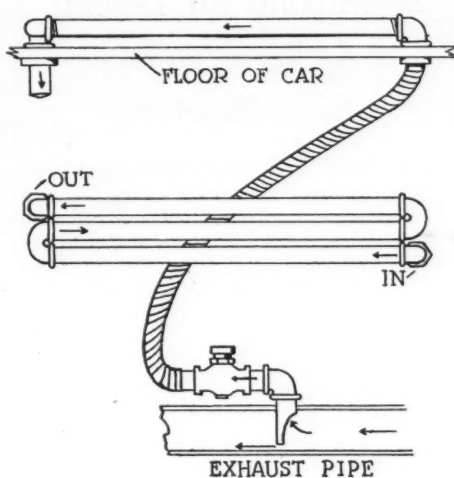
Remove all connections from the head, such as water hose and electrical connections and spark plugs. Remove studs, being sure to use the correct size of wrench. Nothing is more troublesome than a rounded or burled bolt or nut.

When the head is clear of all fastenings, a few light taps, not blows, with a hammer as a rule will loosen it from the seat and it can be lifted off easily. Do not attempt to force it by prying off with a sharp tool, as this will ruin the gasket. With a little patience and two pairs of pliers, by getting above the head and grasping two petcocks or water outlets and lifting evenly the most stubborn fit will yield.

When ready to replace, lay the gasket, which in most cases is composed of two pieces of copper or brass sheet, with some fireproofing material in between on a smooth surface. Clean this thoroughly on both sides with fine emery and wipe off, taking precaution not to bend the gasket.

See that the head seat and cylinder seat are free from dirt, as if left on this will prevent the gasket seating evenly.

Spread some medium-grade lubricating oil in a film over both sides of the gasket. Do not attempt to use red lead or shellac, as it not only makes a mess, but on tightening the head it will run or be squeezed in on the pistons, cylinder walls and valves, getting on the seats and preventing them



A home-made car heater made from galvanized pipe, flexible tubing and standard hardware

from seating properly, eventually causing trouble, ruining the gasket and making it a difficult job to remove the head again. After oiling the gasket, replace evenly and put on the head. In tightening the bolts or studs always tighten the center studs first. Then tighten the center studs of the outside and lastly the studs on the farthest edges. Draw them all down a little at a time and go over them again and again until everything is tight.

By using the above method and a little patience, I have experienced no trouble from any source and the head gasket will last indefinitely.—J. Edgar Finn.

Is the Tube Done For?

When is an old tube worn out? It is a rather difficult matter to determine whether or not a tube has reached that stage of deterioration where it is unfit for use. There is one sure sign and that is porosity. This is the stage where very small cracks can be observed in the rubber when its surface is stretched.

As long as the rubber of an inner tube is alive, it will take patches. The old saw, "there is always room for one more," well may be applied to patching tubes. The method of vulcanizing has a great deal to do with the retention of the alive qualities in the tube and the number of patches it will take. If portions of the tube have become overcured in patching, the rubber which is overcured is dead and is going to give trouble.

Heat is injurious to rubber. If there is an insufficient quantity of tale between the tube and the casing, heat is generated from the friction, and the tube often is vulcanized to the fabric of the casing. Then you

wonder why the tube tears when you try to remove it.

A source of tube splitting is in slippage of the tube between the casing and the rim. This results in pinched tube. Careless insertion of the tube is the reason for this.

Spare tubes should have careful protection. They should be kept in oil-tight and dust-tight cases or boxes. The imitation leather tube cases available at any motor car or tire supply house are excellent for this purpose.

A Home-Made Heater

Seattle, Wash.—Editor MOTOR AGE—The following plans for a cheap and easily-made heater may be of interest to MOTOR AGE readers.

The heater itself is made of $\frac{3}{4}$ -in. galvanized pipe. Three pieces of equal length are threaded at both ends. These are connected parallel to each other with two elbows and two straight Ls. The two open ends are fitted with elbows, and into each of these elbows are screwed long nipples. This completes the heater itself. Of course the length of the heater is limited by the inside width of the car floor.

Next a hole is cut in the exhaust pipe well up toward the engine. A long nipple is brazed in. Before fitting this it should be cut off at a long angle and placed in the pipe so that the opening is facing toward the engine to catch and deflect into the heating system more of the exhaust gases.

To the top of this is screwed an elbow facing toward the back, and a shutoff valve fitted. From the valve a short nipple will complete this assembly.

The heater is now mounted permanently to the floor of the car. Two 1-in. holes are drilled, and a $\frac{3}{4}$ -in. nut run well up the end nipples and the heater set in place. Two more nuts are run up the nipples from below the floor boards and locked hard.

The connection between the heater proper and the valve is made easily with one long piece of $\frac{3}{4}$ -in. pipe, threaded at both ends, and two pieces of 1-in. flexible tubing. The tubing will screw around the $\frac{3}{4}$ -in. pipe and needs no clamps, as the threads hold it fast.

A much more finished job can be had at more expense by slipping brass tubing over the heater pipes and using brass elbows. I made mine 3 years ago and it has been satisfactory in every way. The robes can be fitted with eyes in the corners and buttons mounted on the back top bows. Then the heat from the heater will be retained and the car will be made very comfortable. —Vernon Bowen.



The Readers' Clearing House



WHY SPRINGS HUNG OFF CENTER Difference in Vibration Period Gives Shock Absorbing Effect

WITTENBERG, Wis.—Editor MOTOR AGE—Why is a semi-elliptic spring usually hung off center? That is, why is not the center bolt placed exactly in the center of the spring?—Leslie S. Little.

To afford a shock absorbing effect within the spring itself. The period of movement in one spring is faster than in the other. Take as an example a long spring board and a short spring board. Jumping up and down on the long spring board gives slow, smooth strokes, while jumping up and down on the short spring board gives short and more rigid strokes.

The long end of the spring has a slower action than the short end. Here is what happens. When the car encounters an obstruction the jolt is of course transmitted to the spring. The long end is easier to bend than the short end. Therefore the short end is constantly pulling against the long end, affording a cushioning effect and lessening the rebound. It is this difference in the period of vibration and the consequence of one end of the spring pulling against the other, that is the reason for the construction.

SKETCH OF CUT-DOWN CARTERCAR Cannot Place Seats Low Because of Friction Disk

Buffalo, Mont.—Editor MOTOR AGE—Furnish me with suggestions for converting a model H Cartercar into a speedster.

2—Can a worn cylinder be lapped in by the use of an oversized piston and emery and a good job made of it?

3—Where can one secure complete information on the subject of lapping in?—W. G. P.

1—The illustration in Fig. 3 could be worked out very well with this car. Because of the distance which the friction disks rise above the frame it would be impossible to convert this car into a typical stripped speedster with bucket seats placed on the frame itself.

2—Yes. A fine grade of emery powder must be used.

3—The method of lapping in pistons was explained on page 37 of the Jan. 18 issue of MOTOR AGE.

WANTS TO SLEEP IN STOCK CAR Believes Warner, S. D., Reader Misses One Point

Editor MOTOR AGE—The letter from a reader in Warner, S. D., printed in the Feb. 15 issue of MOTOR AGE is a good one. It expresses the sentiments almost exactly as to what a touring car should be. But there is one thing he has left out, and that is a place to sleep.

Now we cannot all afford to stop at expensive hotels, and sometimes road conditions are such that we cannot get to a town at night, or a breakdown happens

IN WRITING AN INQUIRY to the Reader's Clearing House Department

DESCRIBE THINGS COMPLETELY!

If your car is giving trouble, tell us all about the trouble and what you have done to try to remedy it. Always bear in mind that we are not looking at your car when we are reading your inquiry. Try to picture everything to us as we might see it if we were looking at your car. You understand it. Make us understand it.

Do not write in and say, "My engine has developed a serious knock. What is the trouble and how can I remedy it?" It is as impossible to give an intelligent answer to such a question as it is to answer the question, "Why is a mouse?" Tell us where the knock is, what it sounds like, what effect it has on the operation of the engine, under what driving condition it is most evident, etc. Let us have some tangible information to work on.

Do not ask us questions concerning motorcycles and motor boats. Our field does not cover these industries. Do not ask us for working drawings of engines, gearsets, etc. We endeavor to conduct an information department, but not an engineering department of such a nature. We cannot design the mechanical units of a car for you. This also applies to specifications for speedster bodies to be applied to touring or roadster equipped chassis. We will gladly give a general plan of a body, showing how it might appear when complete, but we cannot furnish complete patterns and working drawings for the construction of these bodies.

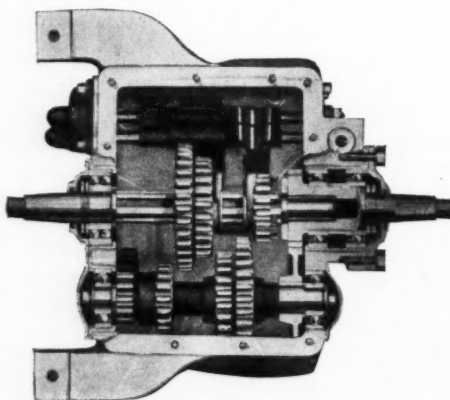


Fig. 1—View of gearset used in 1915
Jeffery Chesterfield six

and we have to seek shelter at a farm house. How much more convenient it would be if the so-called touring car were fitted up so that we might pass the night in it. This could be done easily by hinging the back of the front seat so that it could be let down to form a bed. This, and a place to carry baggage, would make a touring car ideal.

I would like to see an article in MOTOR AGE on this subject. Some of your readers might be able to give information as to how this could be done.—A Subscriber.

Editor's Note—MOTOR AGE would be glad to give space to illustrations and descriptions of cars which have been converted to permit sleeping quarters. If any readers have built their cars over or had them built over for this purpose, we would appreciate photographs that we might print and enlighten such readers as the one who sent in the above communication.

NO RECORD OF GAS CONSUMPTION Amount Used at Different Speeds Depends on Make and Adjustment

Thibodaux, La.—Editor MOTOR AGE—Has MOTOR AGE any record as to the consumption of gasoline at different speeds of a motor car?

Has there ever been any reliable test to that effect? For example, if a motor car is running at the rate of 10 m.p.h. and makes 30 miles on a gallon of gasoline, how much would that same car do on a gallon, running 15 m.p.h.; at 20 m.p.h.; at 25 m.p.h., and at 35 m.p.h.? The majority of car owners believe the faster they go, the more mileage they get out of a gallon of gasoline. I know it to be the contrary and would like to have statistics to prove it.—P. L. Braud.

1—There are no records of general tests covering this. It is such a variable that a test conducted with one make of carburetor would not apply at all to another make of carburetor. You are correct in your assumption that the theory of high speed and low gasoline consumption is incorrect. There is an efficient speed ranging around 20 or 25 m.p.h. Above this or below it the gasoline consumption per mile is greater. However, here again comes in the great variable. An improperly adjusted carburetor may give results just about the opposite.

ELECTRICAL SYSTEM ON MAXWELL Wants to Install Starter and Generator on Old Model

Shinglehouse, Pa.—Editor MOTOR AGE—I am the owner of a Maxwell 25, year 1914, and would like your advice as to whether an electric system could be installed on this car. My idea was to gear the flywheel and use a Bendix drive on the starting motor and to install a generator on the same shaft that runs the magneto with a distributor.

1—What pitch would I have the flywheel teeth cut?

2—Could the starting motor be put on the right hand side of the motor, the Bendix drive towards the back of car?

3—Could the generator be run in place of magneto at the same speed or would it have to be geared up or down?

4—What would be the estimated cost of the system not installed?

5—Would I be able to purchase a second

hand system and would MOTOR AGE advise a second hand system?

6—Where could I purchase a system for this car, new or second hand?—Donald Haines.

1—It would be an expensive installation, probably considerably more so than you realize. The pitch of the flywheel teeth would be regulated by the pitch of the pinion on the starting motor.

2—Such an installation could be made—at a big expense.

3—Magneto speed would take care of the generator.

4—Probably \$150 or more.

5—A second-hand system would be satisfactory if it was in good working order and could be made to fit.

6—You would have to look around for it. Possibly you might find a very good second-hand system that could be fitted to your car at some electrical shop. If you were to buy a complete new system and go to the necessary expense of having special fittings made and the cost of installation, you would find yourself tied up in \$200 or \$300, and we do not think it is worth it. You could probably save money by selling your car and buying a used car equipped with a starter.

OPERATION OF BIJUR GENERATOR Generator of Constant-Voltage Type— System Explained

Detroit—Editor MOTOR AGE—Explain in a clear and concise manner the underlying principle of the Bijur generator as used in Packard cars. As I understand it, the swinging of the connecting plug in the regulator from side to side has no effect whatever on the charging of the battery.

What are the sizes of the field and armature windings of the starting motor of this system? Is a wire or a copper bar used for winding?

The generator used on the Packard is of the constant-voltage type. The voltage is maintained constant irrespective of speed and load by means of a vibrating regulator which is shown diagrammatically at B in Fig. 2. Connected in series with the shunt field winding of the generator is a resistance which is alternately inserted and removed from the circuit field. When the resistance is removed from the circuit, the field is connected directly across the generator brushes. The rest of the diagram is self-explanatory and needs no further comment.

Shifting of the disconnecting plug in the

regulator box from side to side has no effect whatsoever on the charging current. The object of shifting this plug in its socket is to reverse the polarity across the regulator contacts. Metal is carried from the positive contact to the negative contact, building up minute projections on the negative and forming corresponding recesses in the positive. When reversal takes place the material which was deposited from the original positive contact is re-deposited on this contact so that, if reversal is made regularly the life of the contacts is indefinite.

Inquiries Received and Communications Answered

Leslie S. Little.....Wittenburg, Wis.
W. G. P.....Buffalo, Mont.
A. Subscriber.....Detroit
P. L. Braud.....Thibodeaux, La.
Donald Haines.....Shinglehouse, Pa.
H. C. Bland.....Mayesville, S. C.
H. J. A. Ulmer.....Cincinnati, Ohio
Roy R. Bantly.....Johnstown, Pa.
Nell C. Ensworth.....Warren, Pa.
Charles K. Burton.....Gloversville, N. Y.
W. P. Walsh.....Ludlow, Ill.
J. Edgar Finn.....Brooklyn, N. Y.
H. G. Spellmeyer.....Melvin, Ill.
D. H. Jones.....Chicago
H. F. Price.....Webster City, Ia.
L. J. Wilcox.....Fairport, N. Y.
Reader.....Topeka, Kan.
L. P. Hurm.....Overpeck, Ohio
R. J. Weber.....Chicago
A. H. Allison.....Hammond, Wis.
William Ellis.....Beattie, Kans.

ENGINE STARTER A SHOP MOTOR

Article Explains Method of Converting for Above Use

Mayesville, S. C.—Editor MOTOR AGE—I have a Gray & Davis type K starter and generator which came off an Overland of 2 or 3 years ago, both of which I wish to use as motors for constant use about the shop to be used on 32-volt Deleo lighting outfit which I am using. I am using the generator now as a motor by connecting the 32-volt current through the brushes only, which seems to be a strange way to use it. Why is it that I do not have to use the field coils at all in the generator to make a motor of it?

2—What will be necessary in changing the motor so it will use a small amperage, say not over 10 amp. where it now uses 100 amp. of 6-volt current? I thought by

re-winding the armature with suitable size wire and re-winding the fields I could get a very good motor for the 32-volt current, and as this has an internal reduction gear in it, it would make a powerful motor for slow speed work about the lathe and drill press. Tell the size wire for fields and armature and the proper way to connect the fields through the brushes.—H. C. Bland.

This is described and illustrated in detail on pages 24 and 25 of this issue.

WANTS NEW BODY ON SAXON SIX Illustration Shown Carrying Out Reader's Ideas

Cincinnati, Ohio—Editor MOTOR AGE—I am sending a sketch showing a speedster body applied to a Saxon six. Where could I have such a body made?

2—What would be the approximate cost of such a body?

3—The new equipment such as Miller carbureter, Bosch magneto, Leavitt pistons, etc., would be put on by myself.—H. J. A. Ulmer.

1—This is a job for some coach working establishment and we think you might find someone in your locality who could handle it for you. Following are the names of a few concerns who specialize in bodies made to order: Charles E. Schutte, Lancaster, Pa.; Auto Remodeling Co., 1501 Michigan Avenue, Chicago; Detroit Auto Products Co., 38 Sherman Street, Detroit; Lehman Mfg. Co., Cannelton, Ind.; Auto Sheet Metal Works, 2301 South Wabash Avenue, Chicago; Wright, Cooler & Hood Mfg. Co., 4867 North Clark Street, Chicago, etc. You might submit the sketch shown in Fig. 6 for quotations from the above concerns.

2—Probably between \$300 and \$400.

3—The illustration as shown is designed for an 8-in. one-piece windshield, wire wheels and cord tires, etc. The entire rebuilding job with the new equipment which you would have to purchase would probably run into a figure around \$700 or \$750.

More Power From Detroit

Johnstown, Pa.—Editor MOTOR AGE—Kindly tell me how I can get more power out of Detroit eight. The compression is good in all cylinders.—Roy B. Bantly.

You ask us one of those impossible questions that has no enlightening answer. You do not tell us whether the car has lost its original power, the condition of the engine, how much it has been run, in fact, you give us no information concerning the car, nor do you tell us why you want more power or how much you are willing to spend to get more power.

Gear Ratio for Ever Ready

St. Louis, Mo.—Editor MOTOR AGE—I have an Ever Ready speedometer. Inform me what gear ratio this meter should have, using a 31-in. tire.

2—Can MOTOR AGE give me the revolutions per minute of a model S Ford motor?

1—The driving gear should have 70 teeth and the pinion 20 teeth, both to be 10 pitch gears.

2—There is no record of an official speed test on this engine.

Cutting Down Jackson

Blackwell, Okla.—Editor MOTOR AGE—Give me some suggestions for cutting down a 1916

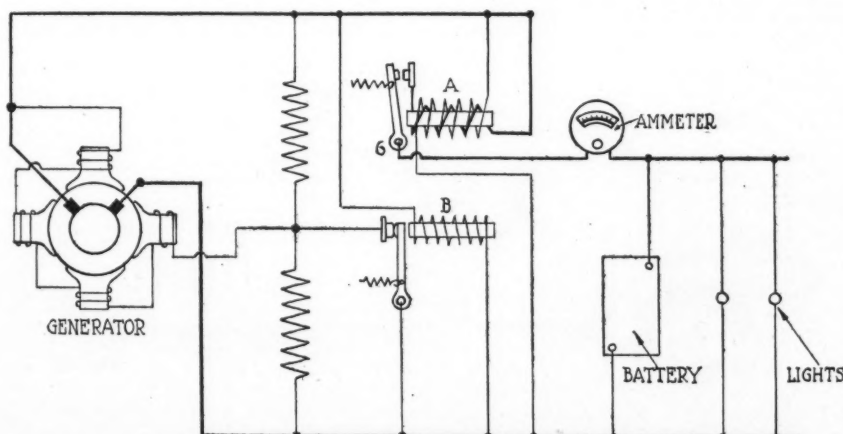


Fig. 2—Chart to explain principles of operation of Bijur system on Packard

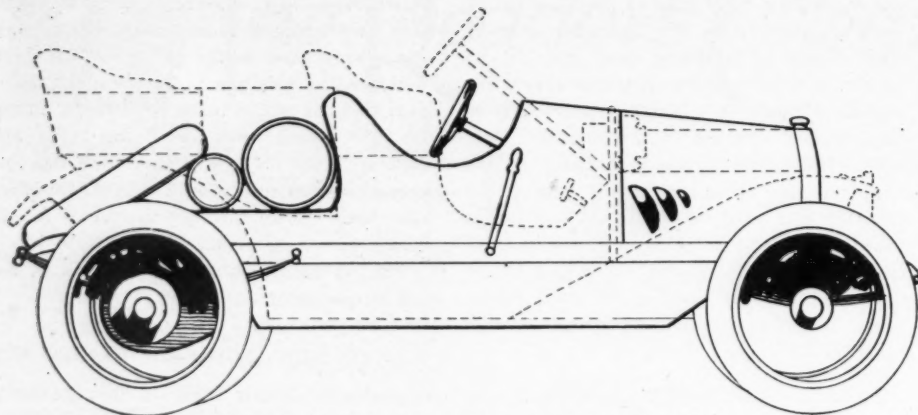


Fig. 3—Suggested body design for use on old Carter car. The seat cannot be real low because of the necessary clearance over the friction disks

Jackson car, model 34, into a racing car.—L. J. Bodine, Jr.

A sketch of how this model might appear if converted into a racing car is shown in Fig. 4. If you did not wish to go to the expense of having a body of this type built up, it would be our suggestion that you strip it with a deck built over the rear and bucket seats fitted with gasoline and oil tanks behind.

SOMETHING ABOUT TOP DRESSINGS Reader Considers Using Dye to Refinish Top Fabric

Warren, Pa.—Editor MOTOR AGE—Publish a phantom view of the 1915 Jeffery Chesterfield six gearset.

2—As it is overhauling season, just now, why not something about the top? I have used a great number of top dressings and have never found two alike. Most dressings are for Pantasote or cotton tops and make a mohair top stiff, but I also find that most mohair dressings made the top stiffer than before. I was wondering if one could use Diamond dyes and put them on with a brush, but as the lining of my car is brown I wouldn't care to have the black run through.

3—Do you think it would if one were careful? The lining is soiled and I would like to color it a little darker, perhaps gray or a darker brown. I would imagine that there are a number of your readers like myself, so give us some ideas.—Neil C. Ensworth.

1—This is shown in Fig. 1.

2—Mention of top dressing and top care were made in the article beginning on page 5 in the March 8 issue of MOTOR AGE. There will be another article in the near future telling of the different kinds of top dressing and their use. As to the use of dyes we can see no advantage in these over dressings, in fact, they afford no weather proofing, and the dressings do.

3—Dyes are mixed with water and in trying to get an even coat of dye over the top some of the liquid would undoubtedly get through to the lining. If your top has pin holes in it anywhere, and we would wager it has, then the dye will find an open channel to get through and damage the lining. Because of its oily consistency a good top dressing is not going to soak through in this fashion.

USE OF MOTH BALLS IN GASOLINE Not to Be Recommended as They Sometimes Stop Up Fuel Line

Gloversville, N. Y.—Editor MOTOR AGE—What is the correct number of moth balls to use to a gallon of gasoline, and do moth balls have any injurious effect on the cylinders, spark plugs, or the motor in general?

2—Will the moth balls dissolve entirely, so

as not to plug gas line or carburetor? If so, after the moth balls dissolve, will they settle in the bottom of the gas tank?—Charles K. Burton.

1 and 2—There is little advantage in using moth balls in gasoline as the improvement is not worth the cost. In cold weather there is danger of stoppage of the fuel line due to crystallization of the naphthalene.

STORAGE BATTERY WON'T CHARGE Supposition That Short Circuit Exists Appears Impossible

Ludlow, Ill.—Editor MOTOR AGE—I have a 6-volt storage battery, 18 months old. For about a year, ever since I have had a hydrometer, the three cells tested respectively, 1.250, 1.240 and 1.210. Last winter I had it disconnected from the machine for 2 months without any change, and it showed no perceptible loss. Thinking the solution was weak from spilling, I sent it to a service station where they tried unsuccessfully to charge it higher. They claim there is a short circuit in it and it must be overhauled. Is it reasonable that such could be the case, without showing any reduction in gravity test for a year?—W. P. Walsh.

The cells test too low, that is evident. However, it is quite unreasonable to suppose that the battery has a short circuit. If such were the case it would not hold its charge as you state. It appears to us that there is something internally wrong, probably with the plates, that will not permit the battery to suspend its full charge.

1912 REGAL WITH TURTLE BACK The 2 to 1 Gear Ratio Is Too High. Better 2½ or 2¾ to 1

Brooklyn, N. Y.—Editor MOTOR AGE—Illustrate a converted 1912 Regal Roadster made into a speedster with so-called turtle back.

2—What metal and what gauge would you recommend for this work?

3—Have you any suggestions to raise the

r.p.m. of the motor of the above car without undue expense?

4—I understand this model car had a weak countershaft or pinion-shaft bearing in the gearset; in other words some of the gearset bearings on this car have to be replaced every once in a while. They say it comes from using second speed. Would you be kind enough to advise a possible remedy and tell me what causes this? Is it poor material or designing?

5—I would like to put a 2-1 ratio in rear axle of this car. Do you think the clutch, gearset and other driving units will stand this? The car will be used in level country on good roads. If the ratio is not right, will you suggest the highest that can be used?—J. Edgar Finn.

1—This will be shown next week.

2—Sheet steel, 22 gage.

3—It could be done by properly installed aluminum-alloy pistons and non-leaking rings.

4—Inasmuch as such a weakness has not been called to our attention heretofore we cannot give the reason or remedy.

5—This ratio seems too high. A 2½ or 2¾ would be more nearly correct, in our opinion.

Piston Shapes

Melvin, Ill.—Editor MOTOR AGE—Which type of piston is considered the best and is the most used, a cup, square or ball head piston, and why?—H. G. Spellmeyer.

A piston with a flat or nearly flat head is the best from a production standpoint as it gives good results and is easiest to manufacture properly. The cup head is theoretically the best as it gives a spherical combustion chamber. There is not a great difference in practice.

Motor Vibrates Badly

Chicago—Editor MOTOR AGE—I have a four-cylinder motor which vibrates badly and which has been overhauled several times. How can this be balanced so that it will run smoothly?

2—Should the pistons be equal in weight?

3—Should the lower end or bearing of the connecting rods be of equal weight?—D. H. Jones.

1—No one could tell you how to balance the engine without first knowing why it is out of balance. It could originate in many different sources.

2—Yes, to the fraction of an ounce.

3—Yes. The complete assemble of pistons, wrist pins and connecting rods with bearings should be equal in weight.

Aluminum Piston in Ford

Paulina, Ia.—Editor MOTOR AGE—I am rebuilding a 1914 Ford. The cylinders are badly worn. Would MOTOR AGE advise reboring and fitting with aluminum pistons and connecting rods, or is there a light steel piston that I can use that is better? Is it necessary to put in aluminum connecting rods if I use aluminum pistons, or would I get any better

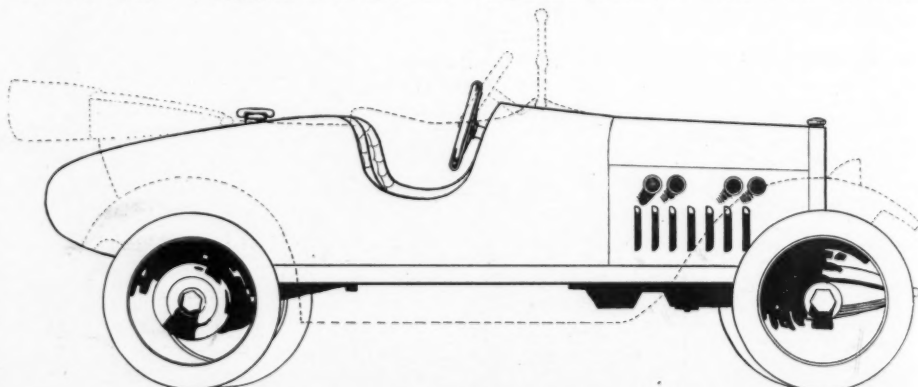


Fig. 4—Speedster body fitted to a model 34 Jackson chassis. This is a true racing type

results by using lighter connecting rods?—J. E. Jennings.

Reboring and fitting with aluminum pistons and non-leaking rings would be an advisable course to pursue. It would not be necessary to install aluminum connecting rods. Lighter connecting rods are an advantage but not as great an advantage as lighter pistons.

Camphor as Carbon Remover

Fairport, N. Y.—Editor MOTOR AGE—Will spirits of camphor remove carbon in an engine, and will same injure the engine?—L. J. Wilcox.

Not very efficiently. Will not hurt engine.

Overland Gear Ratios

Topeka, Kan.—Editor MOTOR AGE—What is meant by an orphan car? One claims it means the same as an assembled car; another says it is a car that no longer is being manufactured.

2—Give the gear ratios of the 79T Overland.

3—When the regularly used mixture of gasoline, vapor and air will not take a car up a hill, will increasing the richness of the mixture give more power?—Reader.

1—A car which is no longer being manufactured.

2— $3\frac{1}{2}$ to 1, $3\frac{3}{4}$ to 1 and 4 to 1.

3—Frequently.

Palmer-Singer Engine Size

Long Beach—Editor MOTOR AGE—I have a Palmer-Singer Six, seven-passenger car, about a 1912 model. Where can I get a catalog to explain the various parts of this car?

2—Give the bore and stroke of the motor.

3—Where can I secure repair parts for this car?

4—How can sprocket wheels be put in in place of the rear wheels?

5—Where is the number of the car located.

—N. D. Robinson.

1—Possibly, Singer Motor Co., New York City.

2—Four by 5 in.

3—Singer Motor Co., New York City.

4—We do not know what you mean by this question. What do you want to use the sprocket wheel for?

5—There should be a name plate on the heel board of the car directly under the seat, which bears the car number.

Ford Engine Stand

Montgomery, Ala.—Editor MOTOR AGE—Give an illustration of an easily made engine stand to be used in running in Ford motors that are new and stiff or have been overhauled. I intend to build one myself and locate it on my shop floor so that it may be connected through a belt with overhead line shafting. I want the simplest and least expensive thing possible.—Edward J. Kessner.

A simple stand constructed of wood, strap iron and angle iron is shown in Fig. 5. You will note that the regular front bearing bracket of the Ford is applied to

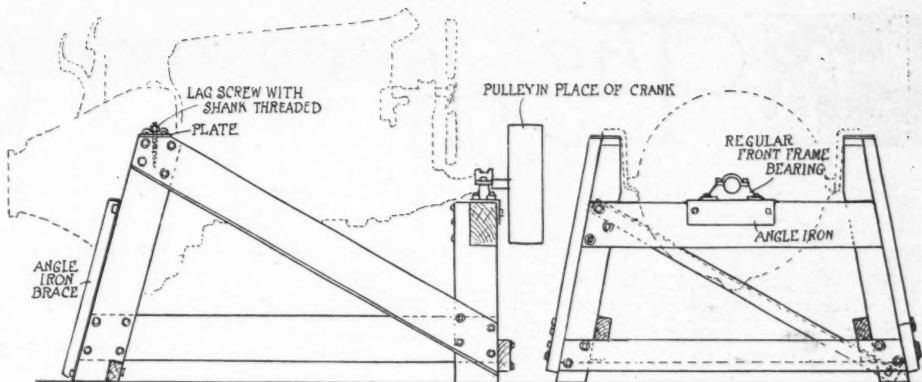


Fig. 5—Simple and easily made engine stand for running in Ford engines

the stand to support the front of the engine.

Parry Pops in Carburetor

Hammond, Wis.—Editor MOTOR AGE—I have a Parry that is continually popping in the carburetor. Have changed carburetors and tried a different coil but used the same distributor. It runs on only three most of the time. When it runs on four it does not pop. Is the trouble in the distributor? The valves and everything else seem to be all right.—A. H. Allison.

The trouble is either in the electrical system or in the setting of the valves, we would assume. However, this is one of those illusive troubles which may come from one of a score of defects and it is quite beyond us to direct you to the exact cause from the brief description you give.

Timing 1910 Buick

Overpeck, O.—Editor MOTOR AGE—Give the correct timing of valves of the Buick motor, Model 17, 1910.

2—Is there any overlap in the valves? If so, what degree?—L. P. Hurm.

1—The exhaust valve should close $\frac{1}{8}$ in. of piston travel past upper dead center, and the inlet valve should open $\frac{3}{8}$ in. piston travel past upper dead center, allowing .010 in. to .012 in. clearance between the rocker arms and valve stems on compression stroke.

2—There is no overlap in these valves whatever.

Value of Two Sparking Points

Beattie, Kan.—Editor MOTOR AGE—I have a Stutz roadster. This is a four-cylinder car having eight spark plugs. When more speed is wanted, the extra four plugs are put into operation. Why do the eight plugs give more power on a four-cylinder car than the four plugs do?—Wm. Ellis.

Because they give a spark of double intensity to the explosive mixture, thus giving

more complete and rapid firing. Regardless of the speed of the motor the gas mixture burns at the same speed, if the temperature of the motor is constant. With an engine which is turning over very rapidly, the combustion of the gas is well crowded and the hotter the spark the more liable it will be that all the gas will burn. Furthermore the two plugs spread the spark over the cylinder from two points instead of one point.

Underslinging Ford

Detroit, Mich.—Editor MOTOR AGE—Kindly publish a drawing showing how to make a Ford underslung.—Ralph Beers.

See page 34 of the March 1 issue.

Moth Balls and Power

W. Palm Beach, Fla.—Editor MOTOR AGE—Will moth balls decrease the strength of gasoline?

2—Will they help to keep the carbon down in a motor if used in gasoline?—A. C. Casner.

1—No. They are supposed to increase the power-giving qualities.

2—No, not practically.

Ford Frame Lowered

Cresco, Ia.—Editor MOTOR AGE—In the December 21 issue of MOTOR AGE are shown cuts of reconstructed Fords with frames lowered. Could I have drawings of same? I am rebuilding my car and would like to lower the frame.—R. C. Bowers.

See the article beginning on page 43 in the March 1 issue of MOTOR AGE.

Remodeling Cartercar

Hastings, Ia.—Editor MOTOR AGE—Could a 1912 40-horsepower Cartercar roadster be equipped with a pointed hood and cowl board or dash as the late model cars which are on the market? Also could an electric starting and lighting system be installed?

2—Does MOTOR AGE think I could successfully paint this car? Does maroon body and white wheels make good appearance?—Kenneth Dolph.

1—Yes.

2—Yes.

The Why of Wire Wheels

South Bend, Ind.—Editor MOTOR AGE—What are the objections to wire wheels?

2—What are the advantages derived from their use?

3—Would it be practicable to use them on cars weighing 2,800 pounds or more?

4—Does MOTOR AGE recommend their use? O. P. Nolsom.

1—The only objection is the difficulty in cleaning, and this is an insignificant one.

2—Light weight and added strength and resiliency.

3—Perfectly.

4—MOTOR AGE can voice no reason against their use, if that is what you mean.

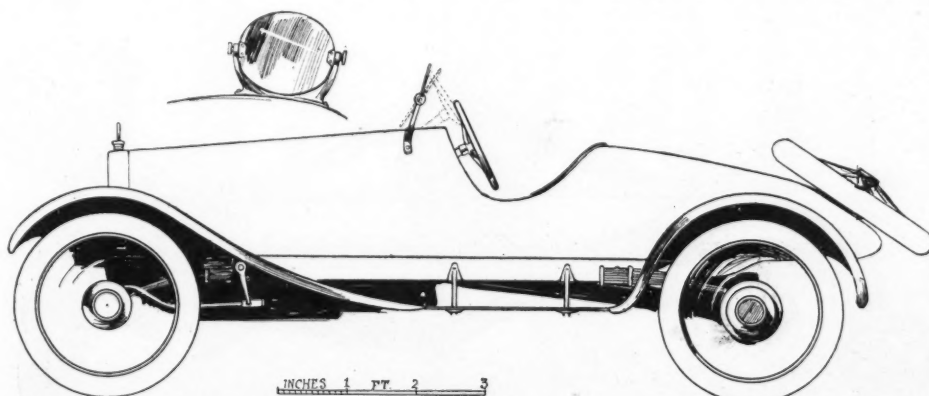
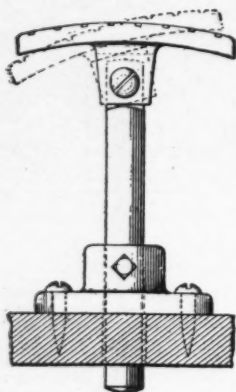


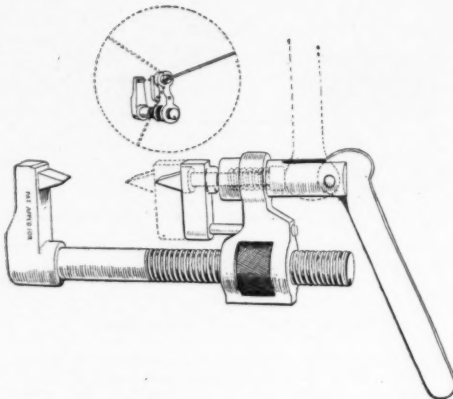
Fig. 6—Speedster body on Saxon six designed after ideas of Motor Age reader



The Accessory Corner



Accelerest to permit even foot pressure on the accelerator pedal



Springleaf spreader operated by one movement of a lever

Brown Spring Oiler

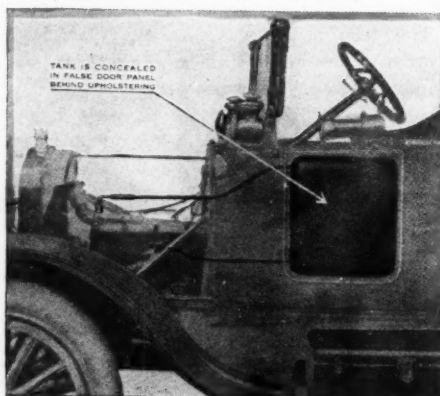
PATENT No. 1,215,904 has just been issued covering the Brown Spring oiler. This patent covers practically all spring oilers in which a felt pad is used, according to the makers. These oilers are applied permanently to the springs and take lubricant through oil holes in the side. To oil the springs it is only necessary to squirt a few drops into the holes with an oil can. The Brown Spring Oiler Co., Cleveland, Ohio.

Wrought Steel Back Catch

The latest Stanley garage hardware fitting is a wrought steel back catch with pull, spring and bumper. This back catch holds the door firmly when swung open against the side of the building. Opening the doors forces the stout hook over the catch plate, in which position it is held down securely by the double leaf steel spring. To unlock the hook, one presses lightly on the thumb piece. The handle is used as a pull to close the door. The escutcheon plate is struck up to act as a bumper against the catch plate, thus taking off of the hook the shock of the sudden stopping of the door's motion. By means of the slotted screw holes the catch plate may be adjusted to meet the bumpers squarely. The Stanley Works, New Britain, Conn.

Thermostat Cooling System

The Thermostat auxiliary cooling system is designed to prevent boiling over of the cooling water in the Ford powerplant system. It is essentially a simple condenser which is automatic in action and easily installed. The Thermostat consists of a tank or vacuum chamber with two seamless copper pipes to connect it with the engine water circuit. This is a pressed-steel tank which fits behind the upholstery in the false door panel at the left side of the car. The condenser is filled automatically from the radiator. There are two



Thermostat cooling system for use on Fords

tubes to connect it with the engine. The upper tube leads from the engine water outlet and the lower tube passes from the bottom of the tank through the floor board to the engine water inlet elbow. Thus steam vapor is readily condensed and returned to the cooling system. The price is \$12.50 complete. The Cawle Co., Indianapolis, Ind.

New Valve Grinder

W. C. Brown of Niles, Ohio, has obtained the patent rights on the valve grinder illustrated on these pages. It is a simple device of such size that it can be very

easily handled. It is so constructed that it may be used singly or in series up to eight at the same time, thus making it possible to grind the valves of a four- or eight-cylinder car in about the same time that it would take to grind one. The inventor would let out the rights for building the grinder if a suitable offer were presented.

Big Capacity Vulcanizer

The Akron Rubber Mold and Machine Co., Akron, Ohio, is bringing out a new outfit for tire repairmen this year. It is a complete outfit with wide range of adaptability and selling for \$125. The equipment consists of two cavities, 2½ to 3 and 4½ to 5; a reducing shell for the 4½ to 5, an inside patch 3½ to 4, on which all sizes of inside work can be done; 2½ to 3, 3½ to 4 and 4½ to 5 bead molds in either quick detachable or straight side furnished with the outfit.

Auto Twin Jacks

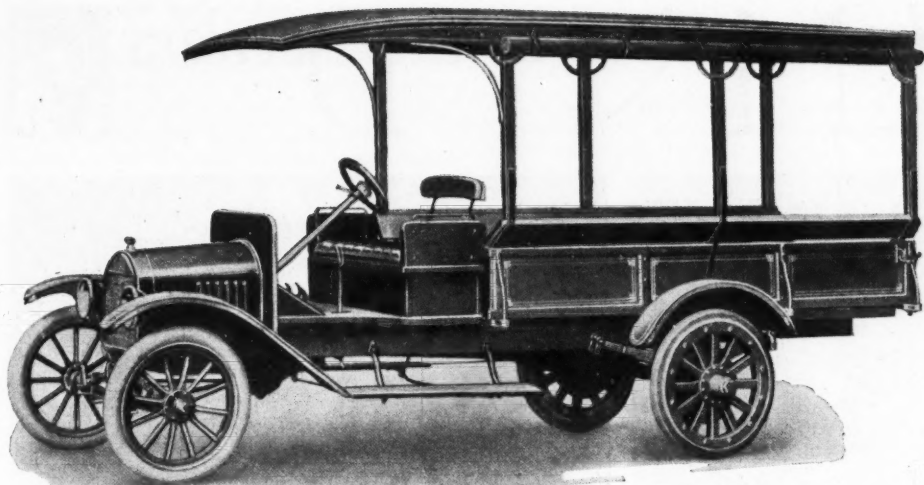
Weaver Auto Twin jacks are designed for public or private garage use in two sizes. They afford a quick means of lifting either axle from the ground and are portable with casters permitting moving of a car from one place to another. A glance at the illustration on these pages will show one how these jacks operate. The regular type sells for \$12 singly or \$20 in pairs and the extra heavy type for \$20 singly and \$36 in pairs. Weaver Mfg. Co., Springfield, Ill.

Detroit Cartridge Lock

The Detroit cartridge lock for use on Ford cars is a magneto circuit breaker enclosed in a case-hardened steel tube which covers the magneto connection plug and extends up above the floor line. Pushing the foot lever on the lock automatically shuts off the engine and locks the car. A serial key is used to unlock the car. The regular coil switch is discarded. When locked it is impossible to make a new connection with the magneto, nor can the locking device be successfully tampered with, so it is claimed. To force the device



Weaver Auto Twin jack for garage use



The latest Parry commercial body for use on Fords with extension chassis

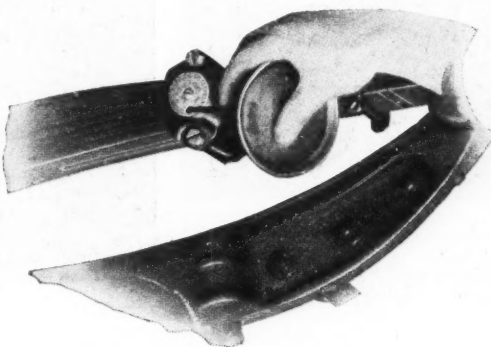
from its base would destroy the magneto connections. The price is \$5. Wallace C. Hood Service Bureau, Detroit.

Another Parry Body

The Parry Mfg. Co., Indianapolis, Ind., maker of commercial bodies for Ford chassis offers a new express body as shown in the illustration on these pages. This has an extended express top for the Ford extension chassis. The demand for this type of a body proved so great that it was decided to embody it as a regular model.

Accelerest for Easy Operation

Everyone knows that it is a difficult matter to maintain an even pressure on a foot accelerator when traveling over rough roads. The Accelerest is a device designed to overcome this difficulty. It consists of a plate screwed to the floor and a convenient distance from the accelerator pedal within which is a post which may be screwed up and down within the plate as an adjustable feature. On top of this post is a pedal which is hinged so that it will rock. The arch of the shoe is rested on this pedal and the toe is used for operating the accelerator. A very even



Showing method of using Brown spring oiler

application of the accelerator is possible with this device. The price is, aluminum, \$1.50; iron, \$1.25. O. H. Hicks, 2615 East Seventy-eighth street, Chicago.

Gasoline Gage for Fords

The Retlaw gasoline gage is said to be as accurate as good design and workmanship can make it. It is calibrated in gallons. To install the gage it is only necessary to remove the regular Ford filler cap and screw the gage in its place. A float operates bevel gears which drive a

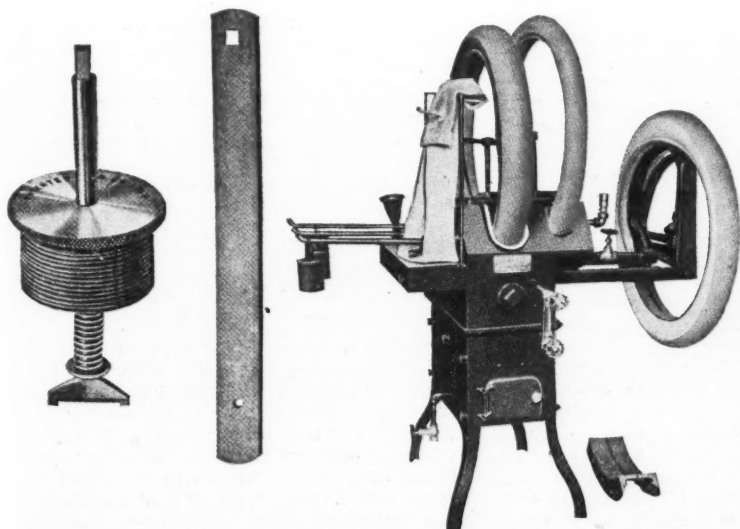
shaft on top of which is a hand within the calibrated dial. The list price is \$1. Detroit Gage & Metal Stamping Co., Detroit.

Cam-Operated Leaf Spreader

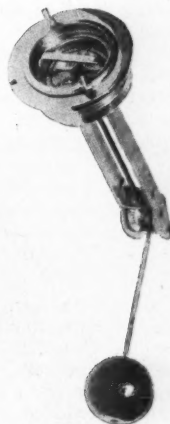
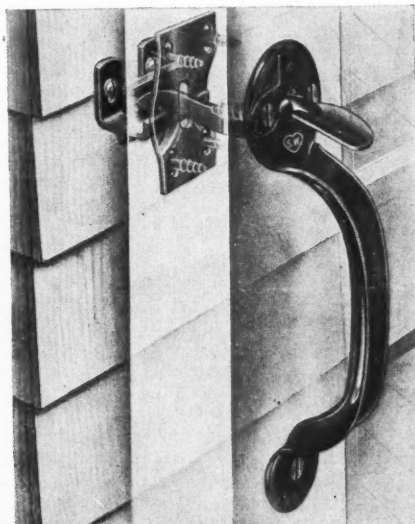
The cam-operated leaf spreader, illustrated on these pages, is a thoroughly sturdy and unusually simple device for opening up spring leaves to get lubricant under them. A glance at the sketch will show that it is readily adjustable by means of a screw shank. The sliding member which is actuated by the cam lever is held against the cam lever by spring tension. To open the spring leaves, it is only necessary to adjust the screw so that the points fit loosely against the spring leaves, move up the cam lever and the springs are opened. This cam lever may be operated from any position within its own radius. The device is the invention of A. F. Weise, 7310 Merrill avenue, Chicago, who would consider offers for its manufacture on a royalty basis.

New Apco Specialties

An oil gage in which no glass is used has been brought out by the Auto Parts Co., Providence, R. I., makers of the Apco line of specialties. It consists of a hollow metal chamber containing a float to which is attached a rod. Fastened to the rod and outside the chamber is a white ball. The distance between the ball and the chamber indicates the oil supply. The petcock, removed for attachment of the gage, is used with the gage for draining purposes. Price, 50 cents. A tow chain for the Ford car, weight about 4 lb. and foldable, is offered at \$2.50. It is rustproof and has been tested to 2900 lb. The chain comes in a canvas bag. The Apco rear view mirror is 5½ in. in diameter. It is of the reducing type, and the mirror is fastened to the windshield by a screw instead of being clamped to the frame. The glass is spun into the mirror frame. The finish is black enamel. Price, \$1.



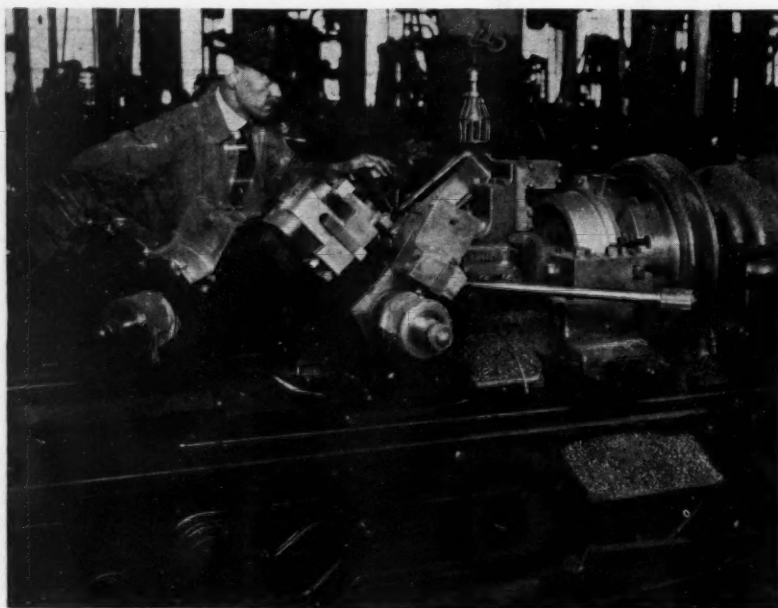
Valve grinder which may be used in multiple and new Akron vulcanizing outfit



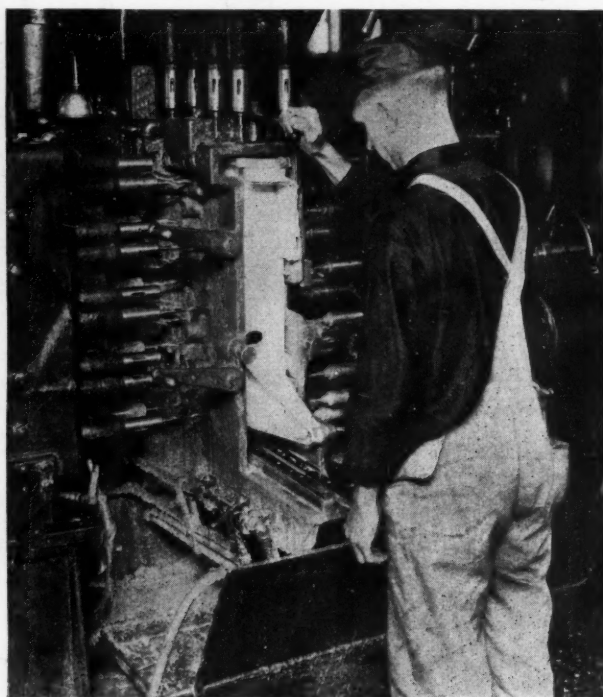
The latest Stanley garage hardware fitting and the Retlaw gasoline gage for Fords



Among the Makers and Dealers



LETTING MACHINES DO THE WORK—One explanation of the ability to buy a better car for less money today is given by the machines in use at the factories. These machines, an automatic turret lathe and a spindle drill, are from the Willys-Overland plant at Toledo, Ohio



WESTLAKE REDUCES CAPITAL—The Westlake Machine Co., Toledo, Ohio, has reduced its capital from \$1,500,000 to \$250,000.

Maise Leaves Springfield Body—Herman Maise, chief engineer of the Springfield Body Co., Detroit, has resigned.

Goodrich Branch at Jackson—B. F. Goodrich Co. has opened a branch at Jackson, Mich., for a retail and wholesale distribution of Goodrich tires. C. F. McGraw has been appointed manager.

Steel to Central America—Charles M. Steel, formerly vice-president of the Carl M. Green agency, will make an extensive trip soon to Cuba, Panama and Central America, partially for pleasure and also for the interests of the Saxon Motor Car Corp.

New Factory at Toledo—The Elkirk Machine Co. has been incorporated for \$20,000 and is backed by Robert L. Ellery and Robert M. Ellery of Toledo Drill & Tool Co. and the Toledo Tap and Die Co. The concern will erect a large factory building at Toledo, Ohio, to manufacture special machinery.

Drives Electric Over Snow—The Ohio Electric Vehicle Co., Toledo, Ohio, unable to get even express cars for shipment purposes, was forced to drive one of its electric cars over snow and sleet to Springfield, Ohio, to have the car there for the opening of the show. The 148 miles were covered without trouble.

Enlists in Aero Corps—Harry Tuttle, connected with the Neumann-Lane Co., dealer in motor cars, has enlisted in the aero corps of the United States army. Mr. Tuttle, who was formerly in charge of the contest work of the Stoddard-Dayton Co., has been interested in aviation for some time.

Hamilton Makes Chicago Connection—The Hamilton Motors Co., Grand Haven, Conn., has closed a contract with the Guaranty Bond & Trust Co. of Chicago as underwriters. The Guaranty Bond & Trust Co. will sell

the stock of the Hamilton Motors Co., covering all but the state of Michigan, which, with the exception of Detroit and Wayne County, will be looked after by James W. Oakes & Co.

Chandler Dividends Declared—The Chandler Motor Car Co. has declared quarterly dividends of 2 per cent and the usual extra dividend of 1 per cent, payable April 1 to stock of record March 15.

To Manage Goodrich Branch—John G. Martin, Rockford, Ill., has been appointed manager of a branch of the B. F. Goodrich Rubber Co., Akron, Ohio, which will be the distributor for northern Illinois and southern Wisconsin. Adjustments will be made for the entire territory.

Bartsch Leaves Bosch Magneto—Alfred H. Bartsch, who has been advertising manager of the Bosch Magneto Co. for the last seven years, has resigned. He has entered the McLain, Hadden, Simpers Co., advertising agency and will be secretary. He is succeeded in the Bosch company by R. S. Westcott, who has been assistant advertising manager.

Lumb Truck Widens Scope—The Lumb Motor Truck Co., Aurora, Ill., is to be known hereafter as the Lumb Motor Truck & Tractor Co. The directors voted to change the name following a decision to manufacture farm tractors, several patent rights being purchased. The company will cater to the rural trade, manufacturing a tractor for field use and a truck for the roads. John K. Gumpfer, late of the Old Reliable Truck Co. of Chicago, has been engaged as chief engineer.

Salesmen Visit Packard Factory—W. J. Parrish, president of the Packard Motor Car Co. of Missouri, and twenty-seven Packard salesmen from St. Louis and Kansas City, Mo., visited Detroit in a special car as guests of J. V. Vincent, vice-president of engineering of the Packard company. The southern

salesmen saw demonstrations of the new twin six and were entertained by a banquet at the Detroit Athletic Club.

Miller to Sterling Truck—L. E. Miller, Rockford, Ill., has been made advertising and sales manager of the Sterling Motor Truck Co., Milwaukee, Wis. Mr. Miller succeeds Roland W. Hutchinson, Jr., who resigned recently.

Plans \$200,000 Addition—The Lakey Foundry & Machine Co., Muskegon, Mich., will erect a \$200,000 addition to its local plant and increase its working force by 500 men.

Tire Plant Location Announced—The Besaw Rubber Co.'s southwestern tire plant will be located in Ardmore, Okla. This city has donated a 5-acre tract to the company, and construction of the plant will start as soon as material can be had. The concern will be known as the Ardmore-Akron Tire & Rubber Co., with J. C. Harmony president and Charles Besaw vice-president and general manager.

To Make New Steering Device—Paul F. Koshollek, Stevens Point, Wis., inventor of a new type of combined four-wheel-drive and steering device for motor vehicles, upon which he has just been granted letters of patent, will establish a small factory at once, principally for the production of working models. Mr. Koshollek will try to enlist capital to organize a manufacturing company and probably will also sell the rights to the use of the device on a royalty basis.

Failed to Remove Tank Label—The Gas Tank Recharging Co., Milwaukee, Wis., was fined \$150 and costs in the United States District court at Milwaukee upon being adjudged in contempt for failing to comply with the order of the court to refrain from filling tanks issued by the Prest-O-Lite Co., Indianapolis, Ind., without first obliterating the company's label. The case was tried by Judge Anderson of Indianapolis, sitting in behalf of Judge Geiger, Milwaukee, who

had previously been attorney for one of the litigants.

Heartz Resigns—Roy D. Heartz, assistant sales manager of the Premier Motor Corp., Indianapolis, Ind., has resigned his position.

Cairns Resigns From Saxon—G. V. H. Cairns, sales manager of the Saxon Motor Car Corp. has resigned. He will announce his new connection soon.

Goodrich Opens South Bend Branch—The B. F. Goodrich Rubber Co., of Akron, Ohio, has taken a store room in South Bend and has opened a branch with W. W. Vandever as manager.

Joins the Leavitt Company—L. V. Starr, manager of the Willys-Overland branch for the last five years at Los Angeles, Cal., has resigned to join the J. W. Leavitt Co. of San Francisco, Cal.

To Build New Parsons Factory—The Parsons Mfg. Co. will erect a new factory on a 1-acre site, recently purchased at Springwells near the new factory of the Saxon Motor Car Corp., Detroit.

Smith Appoints Texas Manager—W. E. Gordon, Dallas, Tex., has been appointed Texas manager for the Smith Motor Truck Corp., manufacturer of the Smith Form-a-Truck attachment for light cars.

Jeffrey Agency in Switzerland—Alford A. Goenner of Basle, Switzerland, has taken the agency for the Jeffrey cars and trucks. Mr. Goenner has sub-agencies in Lucerne, Berne, Zurich and Geneva, Switzerland.

To Handle Graham Attachment—M. W. McClure, Dallas, Tex., and R. A. Graham, president of Graham Bros., Indianapolis, Ind., have formed a partnership and will handle the truck attachment manufactured by Graham Bros.

McKay Empire Vice-President—E. P. McKay, who for many years has been in charge of the Chicago branch of the Empire Tire & Rubber Co., has been elected first vice-president, sales manager and director of the Empire Tire & Rubber Co.

Old Carriage Company Plans Change—The Janesville Carriage Co., Janesville, Wis., one of the pioneer manufacturers of fine horse-drawn vehicles in the Northwest, has decided to reorganize its business for the exclusive production of special motor car bodies. C. A. Buchholz, president, will continue as general manager.

Gary Truck to Expand—The Gary Motor Truck Co., Gary, Ind., incorporated for \$50,000, has awarded the contract for the construction of a new factory. The building will be of steel, brick and glass and cover 132 by 100 ft. The plant, which will have facilities for turning out 500 trucks a year, will be enlarged as demand increases. The company will make five sizes of trucks, in-

cluding the ½-, 1-, 1½-, 2- and 3-ton. It will also make a specialty of motor busses, self-dumping trucks and oil tank cars for dealers.

Gloetzner Assumes New Duties—A. A. Gloetzner, who has been sales manager for the Covert Gear Co. of Lockport, N. Y., has been given charge of the sales, engineering and service departments.

To Build \$50,000 Agency House—The Nash Motors Co., Kenosha, Wis., is to enter the Dallas, Tex., field with the Jeffrey. The company will occupy a new building in the center of the motor car district. The building will cost \$50,000.

Hawk Gets Promotion—J. W. Hawk will become Western sales supervisor of the Chalmers Motor Co. and have charge of the sales in the territory west of Denver, including Honolulu. Mr. Hawk has been manager of the Chalmers branch in Salt Lake City, Utah, since last July.

Jackson Tractor Sales Manager—Fred W. W. Jackson, Holland, Mich., a pioneer in the motor industry, has been appointed territorial sales manager for the Ebert-Duryea Farm Tractor Co., Chicago. The company was organized recently to manufacture a two-wheeled farm tractor.

Langdon With Overland—W. G. Langdon, purchasing agent of the Hayes Mfg. Co., Detroit, has resigned to join the purchasing department of the Willys-Overland Co., Toledo, Ohio. Tom Harris, purchasing agent of the Buhl Stamping Co., succeeds Mr. Langdon at the Hayes plant.

Loomis to General Engineering—Allan Loomis, who was research engineer for ten years for the Packard Motor Car Co., has joined the engineering force of the General Engineering Co. in a like capacity. Mr. Loomis was professor of mechanics in the University of Michigan prior to his Packard connection.

Regal Adds Salesmen—The sales organization of the Regal Motor Car Co., Detroit, has three new district managers. Fred C. Carter, formerly of the Haynes company, will travel in New England. W. H. Bartleman, who has been with the Chalmers company, will take charge of Pennsylvania, and C. P. Townsend, who has been a Winton representative in the South, will have portions of Wisconsin, Illinois and Iowa.

Hatch Resigns From Standard Parts—Charles Hatch, director of sales for the Standard Parts Co. in the spring division and a member of the executive committee, has resigned his position after eight years of service with the Perfection company. Mr. Hatch has been made the director of sales for Parish & Bingham of Cleveland, Ohio, frame manufacturers. W. P. Culver, who has been the Michigan representative of the Perfec-

tion Spring Co. for five years, succeeds Mr. Hatch as director of sales.

Ravenna Increases Capital—The Ravenna Rubber Co., Cleveland, Ohio, has increased its capital from \$100,000 to \$250,000.

Pays Initial Dividend—The United Truck & Equipment Co., Inc., has declared an initial quarterly dividend of 1¼ per cent on its preferred stock, payable March 1.

Stutz Raises Wages—The Stutz Motor Car Co. has increased the wages of its men who work by the hour. Ten per cent additional was announced. More than 350 men will be affected.

Willys-Overland Dividend Declared—The Willys-Overland Co. has declared a quarterly dividend of \$1.75 a share on preferred stock, payable April 1 on stock of record of March 20.

Manages Cadillac Truck Assembly—F. A. Wright has been appointed manager of an assembly plant which the Cadillac Auto Truck Co., of Cadillac, Mich., will open soon in Albany, N. Y.

Myers New Vice-President—T. P. Myers, general sales manager and director of the General Engineering Co., maker of the Doble steam car, has been elected a vice-president of the company.

Case Now With United Motors—J. M. Case has resigned as advertising manager of the Scripps-Booth Corp. to become advertising and sales manager for the United Motors Co., Grand Rapids, Mich.

Acquires Old Gier Plant—The Reo Motor Car Co. has purchased the old steel plant belonging to the Gier Pressed Steel Co. and will use it temporarily for storage purposes. The plant has 44,000 sq. ft. of floor space.

Dickinson With Denneen—C. M. Dickinson has been appointed manager of local sales and service at Cleveland, Ohio, for the Denneen Motor Co. Mr. Dickinson was formerly sales manager for the Champion Motors Co.

Offers Stock to Public—The Wayne Tractor Co., Wayne, Mich., capitalized for \$300,000, is offering some of its capital to the public. The company owns its 22-acre plant at Wayne and has no bonds, funded indebtedness or preferred stock, and all common is fully paid and non-assessable.

Sweepstakes Editors Appointed—The Packard company has appointed contest editors in the four divisions in the company's Lincoln highway sweepstakes selling contest, described in a recent issue. C. A. Barnes was appointed at Cleveland, Ohio; M. A. Johnston in Chicago, H. B. Lewis in New York, B. D. Easling at Philadelphia, Pa., and Louis Lancaster at Pittsburgh, Pa. C. F. Tollzien is the official contest editor at the factory.



SHIPPING BY THE HIGHWAY ROUTE—The above illustration is typical of the shipping arrangements in effect at the motor car factories. Here twenty-six men are preparing to drive as many cars from the Dodge Bros. plant to Pittsburgh, Pa.

From the Four Winds



ROUND-TRIPPING THE CONTINENT—P. O. Scull and C. W. Gut-hill had just completed a round trip across the continent when the photograph at the right was taken. The road shown is a typical road of red gumbo clay the car had to follow

NORWAY EXPERT VISITS COUNTRY—E. Larson, engine expert of the Kullberg Co., Christiania, Norway, spent a week at Milwaukee and other Wisconsin points recently to study tractor design and to place orders for tractors and other power farm machinery for his company.

Kenosha, Wis., Dealers Organize—The Kenosha Automobile Dealers' Association is being organized at Kenosha, Wis., by distributors and dealers. Thomas S. Scott has been named president; Andrew F. Stahl, vice-president, and Theodore Kreimann, secretary and treasurer.

Columbus Enforces Headlight Ordinance—With the coming of the spring driving season, the Columbus, Ohio, police department has started a crusade for the enforcement of the ordinance prohibiting dazzling headlights on motor cars. Several drivers have been arrested and fined.

Ford Dealers Form Club—The Ford Efficiency Club of Birmingham, Ala., has been organized. Its officers are: W. M. Davis, president; C. O. Defbaugh, vice-president; Roy Thrasher, secretary; W. S. Dawkins, treasurer; R. H. Whitner, business manager. Reese Adamson, branch manager, is organizer of the club.

Plan Permanent License Plates—One of the bills offered to the Washington state house contains a plan for a permanent license plate which would affect the saving of \$50,000 annually. The plan calls for permanent license plates with white figures on black background and a slot arrangement on the left-hand side, so that instead of obtaining complete new license plates, a small colored slide will be inserted and attached by six slots to the plate. This inserted or attached plate will bear the letters Wn., year and data to designate character of the car. Each year the sub-plates are to be of different color, making it easy for traffic officers to see whether the plates are for the current year.

Inspector Loses Damage Suit—Because the car he was driving, a Mercer owned by the state motor vehicle department of New Jersey, collided with the car of Joseph Waln, Davis, N. J., badly damaging the latter machine, Inspector William N. Havens, Trenton,

N. J., lost a suit brought by Waln and was ordered by the court to pay Waln damages of \$500. In the initial proceedings against the inspector, brought before Commissioner William L. Dill, Havens was exonerated, but Waln, dissatisfied with the decision, brought suit. It was claimed that the inspector was driving recklessly and on the left side of the road.

Car Pulls Boilers a Mile—Two boilers, weighing 53,350 lbs., were conveyed from a railroad freight house to the station of the Hardin-Wyandot Lighting plant at Kenton,

Ohio, by a team of horses and a motor car. The horses started the heavy load, and the car took hold of it and drew it to the plant, about a mile away.

Club Secretary Settles Collision Case—A trial without a court or lawyers has been heard by L. G. De Armand, secretary of the Davenport, Iowa, Automobile Club. After contemplating civil suits to settle a small disagreement, G. F. Housman, a broker, and K. K. Kenerdine, a motor car salesman, decided to leave their differences in the hands of De Armand. The cars driven by the two principals collided, and each claimed the other was to blame. Both agreed to respect the finding. After hearing the evidence, De Armand decided the responsibility rested with both and that each should pay the respective expense of repairs.

Regret Lost 9-Cent Gas—Milwaukee, Wis., city officials figuratively are kicking themselves because they did not follow the example set by the municipal purchasing bureau of Dayton, Ohio, two years ago in making a five-year contract with the Standard Oil Co. for gasoline for city motor cars and ambulances. Dayton is getting its gasoline at about 9 cents a gallon under the contract system. Milwaukee had the same opportunity as Dayton but refused to consider it, and today the city is paying from 26½ to 27 cents a gallon for its fuel. Milwaukee uses more than 100 gal. of gasoline a day for the municipal cars.

Car Disguised in Vain—A Bridgeton, N. J., owner ordered his car with an unusually fine body attached and made expensive efforts to disguise its make. First, a V-type radiator and sloping hood were substituted for the originals. As the maker's name shone out on the hub caps, a set of bronze medallions were cast, bearing the owner's monogram, and soldered over the caps. The disguise was nearly perfect until someone opened the door and read the maker's name stamped in the metal covering of the sill. These then were taken off, the name hammered out and the plates nicked and replaced. Having completed the elimination of tell-tale marks, he has had a bronze medallion cast, bearing a name of his own choice, and will have this attached to the radiator.

Coming Motor Events

RACES —1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

†A. A. A. championship events for 1917.

SHOWS

March 13-16—Vancouver, B. C.
March 13-16—Fargo, N. D.
March 14-17—Davenport, Iowa.
March 14-17—Parsons, Kan.
March 14-17—Kenosha, Wis.
March 14-17—Mason City, Iowa.
March 14-17—Pittsburgh, Pa.
March 19-24—Paterson, N. J.
March 19-24—Cedar Rapids, Iowa.
March 20-25—Denver, Colo.
March 21-24—Danville, Ill.
March 21-24—Raleigh, N. C.
March 21-24—Trenton, N. J.
March 22-24—Mankato, Minn.
March 27-31—Clinton, Iowa.
March 27-31—Deadwood, S. D.
April 4-7—Stockton, Cal.